N.A.C.A. BULLETIN

February 1957

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N.A.C.A. BULLETIN

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What Integrated Data Processing Aims At

by HAROLD G. HUNSBERGER

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Held up here, in small compass, for the scrutiny of those who have read a good deal in applications to date of integrated data processing, is a view of its elements and of the benefits which would naturally flow from applications if undertaken in a practical manner. The distinction between integration of data processing as a concept and of electronic equipment as an advanced method of application is maintained.

DATA PROCESSING is is the accumulation of data for management in accordance with the requirements of the accounting system. Processing of data in any system includes the following elements:

1. Transcribing—the reproducing of information to facilitate further processing or preparation of reports.
2. Calculating—the making of arithmetical computations.
3. Filing—the methodical storage of data for possible future use.

Integration is Single-Pool Processing of Data

Data processing systems generally provide for the accumulation of operational and statistical data in separate information pools. An integrated system on the other hand, is a plan of accounting which, taking advantage of natural relationships of source data and its ultimate use, requires coordination of operational and statistical reporting. Integration of data processing, therefore, provides for the replacement of parallel and competing data processing systems with a single coordinated system, thereby creating a complete information pool from which management can economically obtain desired information. The components of

COMPONENTS OF AN INTEGRATED DATA PROCESSING SYSTEM

1. **ACCUMULATION OF DATA**
   Aim: To make available currently information pertaining to operations by planning input to yield maximum of information.

   Method: Procedures should be designed to use mechanisms that will record data (as a by-product in many instances) in a language that is acceptable to processing equipment.

2. **TRANSMISSION OF DATA**
   Aim: To provide for rapid flow of data to processing area.

   Method: Modern high-speed or conventional systems, compatible with language of the data recording mechanism, should be utilized.

3. **PROCESSING OF DATA**
   Aim: To sort, correlate, compute and summarize data, compare with like periods or budget.

   Method: High-speed electronic equipment is able to handle great volumes of data economically at great speeds.

4. **PRESENTATION OF DATA**
   Aim: To present partially evaluated and more varied data.

   Method: The analytical ability of high-speed electronic computers permits the presentation of reports that are evaluated in accordance with established company procedures.

EXHIBIT 1

an integrated data processing system are set forth in Exhibit 1 and include the same elements that exist, in some form or another, in all data processing systems. The source data providing current information about operations continues to be accumulated from the same basic documents (sales orders, purchase invoices, material requisitions, etc.) common to all data processing systems. The gathering of this data into a single complete pool, rather than specialized pools, is the aim of integration.

Wherever possible, this gathering of data should be planned to provide for the recording of all source data in common machine language, as a by-product of the creation of a document. The automatic recording of data in a common language as close as possible to the point of origin is an important factor in integration. One of the major steel companies and one of the leading producers of light-weight metals have reported that they are utilizing five-channel paper tape in their integrated procedures for the accumulation of data because of its

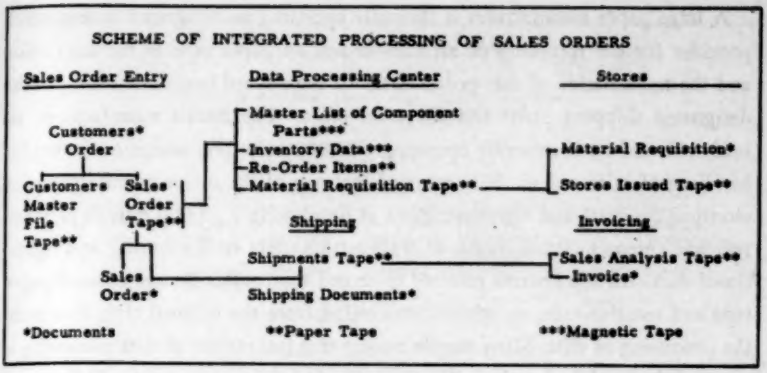

EXHIBIT 2

compatibility with communication systems. Other companies are planning to record all data on punched cards. There is also a possibility that magnetic tape, the internal language of many computers, may become a common language for other office machines. In Exhibit 2 there is presented a procedure for processing sales data. Under it, a complete recording of all available data is made in machine language, as a by-product of the preparation of the sales order, and controls the processing of the sales data from the entry point to the preparation of the sales invoice and its recording on the books of account.

Solving the Data-Transmission Problem

Transmission of data is an important factor in the availability of information at particular points and, hence, in integrating its processing. Even within-plant communications difficulties can cause delays in the availability of data where it is needed and companies which have widespread sales and manufacturing organizations frequently find that three or more days are required for information to reach the home office. This time lag must be shortened if data is to be processed in one company pool and still serve the needs of local units for information summarized in a form for evaluation. Through the establishment of a coordinated data gathering system, providing for the recording of source data in a form acceptable to modern communications systems, it is possible for complete operational data to be reported to the home office with little or no delay and with no additional clerical effort other than that required to insert the paper tape in the transmitting mechanism.

A large paper manufacturer is currently operating an integrated system which provides for the recording of all sales orders on paper tape in the sales office and the transmission of sale orders data, via high speed communications, to the designated shipping point and the main office. The metals manufacturer, already referred to, is presently operating a 20,000 mile communication system for handling of sales orders. It is reported that one of the major manufacturers of electrical products and electronic items is developing a 13,000 mile high speed two-way communication system to transmit a variety of accounting and operational data. All the systems referred to record source data on five channel paper tape and use this tape, or other tapes created from the original tape, to control the processing of data. Many people assume that integration of data processing is accomplished solely by the utilization of electronic equipment. This is not necessarily the case. Many integrated systems that are currently being designed will provide for utilization of the same equipment that is currently used to process data. For example, if the processing is to be performed by tabulating equipment, the common language paper tapes can be readily converted to punched cards by tape-to-card converters. This conversion can be accomplished with greater accuracy and speed than is now possible under the present method of having key-punch operators prepare punched cards from source documents. After the paper tapes have been converted to punched cards, data processing would follow ordinary tabulating procedures.

If it is planned to utilize electronic equipment to process data, the five-channel tape can serve as input media for most equipment or the tape can be readily converted to the required form through the use of auxiliary equipment. Electronic data processing equipment has the ability to sort, collate, add, subtract, multiply, divide, compare and select in any sequence at phenomenal speeds. However, in order that these operations can be performed, it is necessary to develop a complete program describing the entire procedure in minute detail. The equipment appears to have unlimited capabilities, but one thing must be remembered—it will perform only those operations it is instructed to do and only in the prescribed sequence.

The ability of electronic equipment to process data at phenomenal speeds and to record the data on magnetic tape, makes it possible to establish a coordinated information pool consisting of magnetic tape files containing all accounting and operational data, as illustrated in Exhibit 3. This permits management to obtain from these files varied and accurate data rapidly and economically.

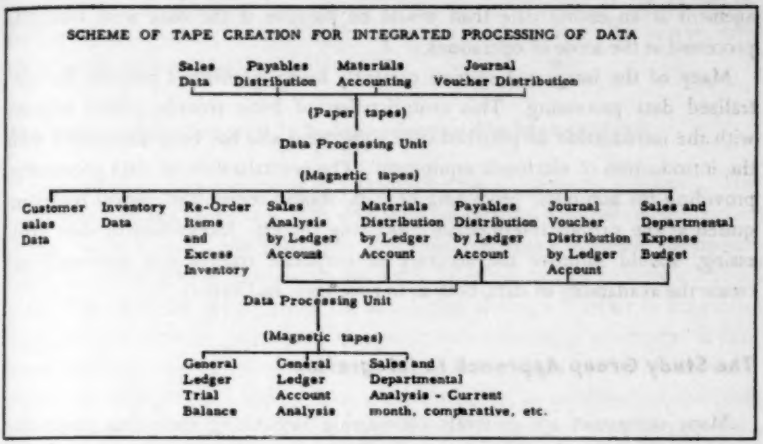
SCHEME OF TAPE CREATION FOR INTEGRATED PROCESSING OF DATA
Sales Data
Payables Distribution
Materials Accounting
Journal Voucher Distribution
(Paper tapes)
Data Processing Unit
(Magnetic tapes)
Customer sales Data
Inventory Data
Re-Order Items and Excess Inventory
Sales Analysis by Ledger Account
Materials Distribution by Ledger Account
Payables Distribution by Ledger Account
Journal Voucher Distribution by Ledger Account
Sales and Departmental Expense Budget
Data Processing Unit
(Magnetic tapes)
General Ledger Trial Balance
General Ledger Account Analysis
Sales and Departmental Analysis - Current month, comparative, etc.

EXHIBIT 3

Prompter and More Incisive Reporting

The presentation of data is the end product of the data processing system. The development of an integrated processing system will permit improvements in presentation of data and the utilization of electronic equipment will permit even greater improvements. The speed and accuracy with which data, recorded in a common language, can be transmitted and processed after the initial recording on five-channel tape, will enable the processing system to provide management with current data on topics of immediate interest, such as current sales or production data.

The logical analytical capabilities of the electronic computers will permit the preparation of partly evaluated reports, such as a listing of inventory items that have reached the re-order level. In preparing this listing, the computer would have taken into consideration such facts as current consumption, time required to obtain delivery and other facts, which the purchasing department wants reflected in selection of the items to be ordered.

The method of data processing need not necessarily require the establishment of a centralized form of organization. Many authorities are of the opinion that the development of an integrated data processing system will have little effect upon the type of organization. Others are predicting that integrating data processing, utilizing high-speed communication systems for the transmission of data, can permit greater decentralization of operations. This possibility stems from the fact that the processing center can submit operational data to local man-

agement at an earlier date than would be possible if the data were manually processed at the scene of operations.

Many of the integrated systems currently being established provide for centralized data processing. This centralization of basic records gained impetus with the introduction of punched card equipment and has been accelerated with the introduction of electronic equipment. The centralization of data processing, providing for automatic processing of data, should reduce the clerical forces required at the various intermediate processing centers. Integration of data processing, should improve the accuracy of corporate records and materially increase the availability of data, both as to timeliness and variety.

The Study Group Approach to Integration

Many companies are currently considering integrating their data processing systems. Once this decision has been made the company is faced with determining how best to approach the problem. Most of those which have undertaken such programs have established study groups of key personnel to study the problem. The personnel of the study groups frequently are selected from the departments most affected by integration. They are frequently assisted by management accounting specialists and advised by representatives of equipment manufacturers. In order that the study group can effectively advise management, the qualifications of the members should include:

1. An understanding of the objectives of company management.
2. A knowledge of auditing and legal requirements which the information developed must meet.
3. Analytical abilities and imagination.
4. An understanding of the fundamentals and application of internal control.
5. A progressive attitude toward the possibilities of integrated data processing.

Management should establish definite aims for the group and should allow ample time for thorough study. The duties of this study group should include:

1. Acquiring a knowledge of equipment available to record, transmit and process data.
2. Arranging for charting of existing procedures.
3. Providing management with recommendations as to the most suitable equipment to be acquired.

The group should chart existing procedures. Analysis of these charts may reveal areas in which procedures can be streamlined. It is important that related changes be made as soon as practicable for the reason that the revised procedures may provide a better base for determining the type of equipment to be recommended. The members of the study group should be fully aware that, in order to successfully complete the survey, they will have to obtain the co-

operation of all departments. The obtaining of cooperation at the outset of the survey will have a material effect upon the completion of the survey, and the ultimate revision of existing procedures.

The Integration Concept Is Independent of the Means Used

Integration of data processing is a possibility for all accounting systems. The small company may achieve a high degree of integration through the utilization of the "write it once" principle. The larger the company the greater the opportunity to utilize electric accounting machines, punched card or electronic equipment. The size and complexity of the accounting system is a factor in determining how data is to be processed. Electronic data processing equipment is currently serving as an excellent tool in handling information pools for insurance companies and public utilities. Yet, even though it is entirely probable that electronic data processing equipment will ultimately prove of even greater value in processing accounting and operational data in companies of all types, integration of data processing is not synonymous with use of these equipments. Integration is a plan for accumulating and processing data for accounting and operational reporting, by whatever means is most practicable under the circumstances.

Judging the Profitability of Machine Accounting

by B. H. SEMLER

Vice President and Controller, Freeman Shoe Corporation, Beloit, Wisconsin

In this summary of considerations affecting the advisability of venturing further into the use of accounting equipment, the matter of company size is placed to one side and that of profit betterment is offered as a control. Several types of favorable profit effects are identified and instances of multiple use (integration) of basic data are supplied.

WE HAVE WITNESSED an entirely new philosophy of business operation in the rapid development of the science of business management and of professional business managers trained in the operation of complex business in a highly competitive atmosphere. As part of this change, it is now recognized that there is a very strong tool of management in the proper use of the information available through accounting records. The utilization of this information has resulted in the need for faster, more efficient methods of processing basic accounting data. To fill this demand calls for the same continued emphasis on mechanization and technological improvements in the office areas, as in the plants. Although there appears to have been some resistance to this trend and, therefore, some delay in the progress made in the office, now the general applicability of the industrial engineering time and motion measurements to the office function is developing very rapidly, as is also the field of machine accounting, the center of attention in this article. In fact, the developments in machines for use in accounting have kept pace with the increases in horsepower in automobiles, the jet age of airplanes, and the uses of atomic energy—and we have just begun.

Not a Question of Business Size But of Profit Effects

In appraising the present status of machine accounting, particularly the point at which equipment becomes applicable, it is not my intention to become involved in the technical aspects of any particular machine. Rather, I would like to explore the significance of accounting equipment in the operation of business and the factors to be considered in evaluating the installation of such equipment. First of all, in my opinion, the size of a business is the least important

of the factors to be considered in deciding whether or not a company should install machine accounting. The size of a company measured in terms of sales dollars, number of products, or number of employees, is no indication of the complexities or requirements of accounting. The shoe industry, for example, with the problems of product width and size, has a far more complex problem of production and inventory control than businesses many times larger.

Most machines developed for accounting use have the attributes of accuracy, flexibility, and speed. It is the combination of these three factors that has stimulated the growth of machine accounting by contributing to an improvement in profits. In the final analysis, the only sound measure of benefit is the extent to which profits can be improved as a direct result of the installation. Accountants have developed very elaborate methods and formulas for evaluating the desirability of capital expenditures in the plant. These same measures should be applied to the evaluation of equipment for the office Office equipment is just as capable of producing a return on investment as manufacturing equipment. At times the lack of accurate clerical cost information, plus the difficulty of evaluating the profit contribution of present or potential accounting or statistical information, makes a computation rather difficult. Nevertheless, the computation must be made.

How Machine Accounting Tends Toward Profit Betterment

I would like to reemphasize that the proper evaluation is not one of cost reduction, but of profit improvement. It is apparent that the root question to be answered is "Will the net income be more or less as a result of the installation?" To further emphasize this point I would like to cite a few possibilities of profit improvement without cost reduction:

1. Reduction in capital requirements, through records and controls, which can result in a reduction in the required investment in inventory may well be worth an increase in cost which would be more than offset by the earnings potential on the capital made available for other purposes.
2. Possible improvements in customer service may result in substantial increases in sales volume, thus generating a profit which could offset a significant increase in cost.
3. Detailed information which makes possible a closer evaluation and control over the profit by line and the mix of sales may produce substantial profit improvement.

Another advantage which has been recognized over the years as a supplemental benefit from machine accounting is the forced compliance with a standard procedure. This benefit has been under-estimated or ignored in too many instances. The conventional manual methods generally permit a high degree of exceptions to prescribed routines. It is always easy to incorporate in them

the whims and fancies of individuals and to have these expanded with changes of employees. The volume processing of transactions on a mechanical basis does not permit exceptions and, therefore, forces a continuing compliance with the established procedures.

The greatest contribution to profit improvement from the recent developments in machine accounting can be summarized in one very significant word. This work is "integration". This term, which has been expanded into "integrated data processing", is the key to machine accounting benefits. The concept of integrating accounting routines has opened up an entirely new field of potential which is still very fertile in most companies. It is a continuing challenge to the accountant and methods man to streamline and improve the accuracy of the records through integration. The multiple use of information put into a common language form at the earliest possible stage in its recording permits the development of records which can contribute immeasurably to the profit potential of a business.

Multiple Use of Basic Information

I would like to cite just a few simple examples of some of the potentials which can be found from following through to an extended use of information available in the basic records. The most common procedure considered in the installation of machine accounting is payroll. The complications of payroll calculations and the necessary records on deductions and earnings have provided the volume factor which has justified machine accounting installations in the past. Stopping with the conventional payroll calculations and records, however, is stopping with a job less than half done. The profit improvement potential over and above cost differentials is found in the supplemental use of payroll information. The analysis of payrolls by department and labor classification, the analysis of excess costs of down-time, the comparison of earnings with standards on a timely basis all can have a very substantial effect on profit improvement in most companies.

Another area generally very productive of cost savings potential is in inventory records. It is not uncommon to find two, and many times three, separate inventory records in various departments or sections of a company. These records, all purporting to be necessary, often provide three different answers for the same inventory. They require a considerable amount of time in reconciling one set of records with another. The purchasing department may feel it requires an inventory to adequately make its purchases. Production control insists on an inventory in order to properly schedule production. The accounting de-

partment "must" have an inventory record in order to support the ledger control. Machine accounting has offered a possibility of satisfying the requirements of all these areas through a comprehensive report on a timely basis in multiple copies, which gives the same answer to all areas at the same time. Time, therefore, can be devoted to the use of the information.

Closely related to the inventory records on finished goods is the information required for production control. An order writing procedure on a machine basis generally provides, as a by-product, a summarization of quantities received, by product classification. The secondary use of this information for prompt planning of production provides a means for covering these orders as rapidly as possible. A further extension of integration in production control can carry the same information into a determination of raw material requirements. This, also, opens up the entire field of integrated records on production which can be used for cost determinations as well as variances from established standards.

There are many other illustrations of the type of information which can be made available readily from the basic information incorporated into machine accounting. The big challenge to the accountant and systems man is the use of a great deal of initiative and imagination to provide all of the information that is of value without evoking an undigestible amount of detailed statistics. We must always keep in mind that there are still many jobs which should not be accomplished on a machine accounting basis and still more that are proper applications only if the machines are otherwise available.

The Point-of-Action Question: "When?"

I have attempted to review very briefly some of the principal factors in the use of accounting machines, which contribute to profits and, therefore, provide the reasons why we install machine accounting. We can now better summarize the answer to the question of when we should proceed with such installations. This is answerable by determining when the company will reap sufficient advantages from the reasons why, to provide a contribution to profits. The significant "when" factors would appear to be the following:

1. ***When*** a preliminary review has been made for the purpose of defining the present procedures and possible future requirements.
2. ***When*** there has been established a receptiveness in the organization to a change from a manual method to an integrated basis of operations.
3. ***When*** management has indicated its interest in and capability of using effectively the information which can be available.
4. ***When*** the production of this information on more complete and timely basis will result in a greater profit as a return on investment.

But No Tears for John Small

by DONALD HOFFMAN

Secretary-Treasurer, International Heater Co., Utica, N. Y.

When a company cannot economically use advanced data processing methods and yet has proportionate needs for prompt and evaluated information, there are, says the present author, effective ways of utilizing, instead, the advantages of being small. He outlines procedures under which daily and monthly reports serve a management which keeps close to the scene of operations and can use them effectively.

THE RASH OF MERGERS and consolidations in recent years, the emphasis on bigness, and the attendant development of electronic accounting aids which these industrial giants are better situated to utilize than are their smaller counterparts combine to put a greater than ever premium on the creation and utilization by small business of techniques and procedures stepping up the efficiency and value of the statistical data compiled for management use in guiding the business.

The emphasis in electronic data processing has been directed primarily toward major corporations with costly programs, large-scale operations and large-size computers. Concern must be felt for the companies in which so ambitious a program is not feasible. Still more concern is in order for the multitude of still smaller business operations—with 1,000, 500, or fewer people. The number of such organizations dwarfs the number of large and medium-size operations and their total personnel may exceed the total personnel of the giants and near-giants. How shall they compete and survive? How are the jobs in these companies to be preserved and the men who fill them made secure in their employment? We deal here only with the management—not the industrial process—and the information it requires. To a large extent, these are the companies still managed in an outstandingly personal way by, shall we say, John Small, who is neither an expert in the technology, nor able to spare the time or the staff to devote to becoming thoroughly familiar with the tremendous developments in automatic equipment and the integrated processing of so many kinds of production and administrative information. Must he throw in the sponge? Must he climb on someone else's bandwagon? Must he give up his freedom of decision and independence of action and merge his business with someone else's? Is the small, independent enterprise doomed to be swallowed up by automatic monsters?

The Advantages of Being Small

Certainly John Small has cause for concern but, if he pauses to take stock, he also has occasion for renewed confidence in himself and his enterprise. We will relate this more specifically to current developments but, first, the advantages inherent in smallness should be noted. They include:

1. Intimate personal relationships internally—John Small has the advantage of personal contact and intimate relationship possible with all the members of his organization—an advantage denied the industrial giant with its impressive size but handicapped by concomitant unwieldiness and abstract personality. Mr. Small has a chance to know and be known by the people with whom he works, to stimulate their best efforts for the common cause more readily than does the management of a larger enterprise.
2. Flexibility—He can offer special personalized service, make decisions or arrangements not encompassed by announced policy, without red tape and delay necessitated by going through many channels and covering diverse locations.
3. Versatility—He has an opportunity, through internal education and close personal relation with his people, to develop a versatility of individual abilities throughout his organization, plus a sense of usefulness and of belonging difficult for the large organization to match or even approach.
4. Control—He can be closer to the pulse of his operations, know more quickly of misadventures, and expedite remedial action.
5. Concentration—While his big cousin is devoting a measure of time and energy to problems accompanying electronic equipment installation and to convincing workers and union of its ultimate net benefit to everyone, John Small can plead "not guilty" to dislocation of employment and can concentrate on non-electronic improvements.

Stimulated by the progress and accomplishment of his larger competitors or of other industries—and for this he is indebted to his gigantic cousins—Mr. Small surveys his own procedures, realistically determines that, while it may not be possible for him to utilize electronic brains, he can use his own in finding newer and better mechanical and manual procedures in engineering, production, distribution, and administration to accomplish economies, control operations, and improve profit yields.

A Small Company Faces the Situation

Our company fits into this small business category. We market a line of automatically-fired warm air heating and cooling equipment, together with the sheet metal pipe, fittings, and accessories incident to their use, throughout the area of the United States east of a line from the Dakotas to Louisiana. Historically, our industry has been one composed largely of relatively small privately-owned units, the control and operation of which has generally not been publicly disclosed. As a consequence, measurement yardsticks for management guidance regarding industry developments have been largely unavailable from public sources. In turn this has placed emphasis on the need for independently developed criteria and we have geared our information-producing techniques accordingly.

Recently, the integration of heating and cooling has brought about a rapidly developing trend toward mergers and consolidations in the two industries. This means larger individual entities within the new industry and more public ownership. Eventually, this may bring broader dissemination of industry statistics and adoption of many of the techniques available through electronic data processing. In the meantime, companies retaining their previous identities and corporate structure need, more than ever, other tools and techniques for management guidance and planning.

We utilize orthodox and commonly used control tools, for one a fairly complete set of budgets and forecasts (sales, production, equipment and facilities, general administrative and selling expenses, cash requirements, and operating results). We have review—constant, periodic, annual, and spasmodic, as the case seems to require—of production methods, markets, and marketing practices, shipping, distribution and administrative procedures, equipment and financial requirements, and overall short and long-range goals. These are basic fundamental operating concepts, commonly used, understood, and not warranting more than passing comment here. Among our non-electronic brain-children are some plain hand-tailored "gimmicks" for on-the-spot knowledge and daily control, others for quick approximation of periodic operating results, a capsule presentation for management and the board of directors on accomplishments, shortcomings, and trends, and a tabulation of each sales area's contribution to general overhead.

Prompt and Useful Operating Reports

For daily control purposes we utilize the forms marked as Exhibit 1 and Exhibit 2. The former sets forth the projected and actual daily and cumulative month-to-date figures on the quantities of major product lines produced in our plant departments. It also compares the projected and actual daily and cumulative unit figures on incoming orders received, shipments made, and unfilled orders awaiting shipment. The dollar value of merchandise billed is also accumulated for comparison against the projected sales volume. From this tabulation we know daily at the end of that same day the overall plant output and shipments, for comparison against the expected results. We can quickly investigate and correct delays in output, detect whether incoming orders are above or below expectations, whether inventory build-up or reduction is in line with anticipations, whether or not we are meeting shipping schedules, and generally have a quick pulse of day-to-day flow of production achieved, orders received, and shipments made. Exhibit 2 compares daily and cumulative hours required

DAILY PRODUCTION, ORDERS IN, AND SALES

Month_____ Forecast Units Assembled Product A_____ Product B_____ Forecast Sales Units Product A_____ Product B_____ Forecast Total Sales____

ASSEMBLY DEPARTMENT DATA								ORDERS AND SALES									
Daily					Month of Date			Daily				Month to Date					
Product A		Product B			Product A		Product B	Product A		Product B		Product A		Product B		Unit Orders on Hand		Total
Units Assem.		Units Assem.			Units Assem.		Units Assem.	Units	Units	Units	Units	Units	Units	Units	Units			Dollar
Date	Plan	Act.	Plan	Act.	Plan	Act.	Plan	Act.	Ord'd	Shp'd	Ord'd	Shp'd	Ord'd	Shp'd	Ord'd	Shp'd	A	B	Sales
1																			

EXHIBIT 1

DAILY ASSEMBLY LABOR

Month_____ Forecast Units Assembled - A_____ - B_____

ASSEMBLY DEPARTMENT DATA

	Daily						Month to Date			
	A		B		Final Assemb.	Final Assemb.	Final Assemb.	Final Assemb.		
	Sub-Assembly		Sub-Assembly		Labor - Hrs. A	Labor - Hrs. B	Labor - Hrs. A	Labor - Hrs. B		
Date	Budget	Act.	Budget.	Act.	Std. Paid	Std. Paid	Std. Paid	Std. Paid		
1										

EXHIBIT 2

to produce major product lines. Here the principle of management by exception applies well. If projected quantities are produced in alloted time, everything is serene. If total output is down or standard hourly requirements are exceeded, plant supervision have immediate knowledge, can investigate, and can take corrective steps.

On the afternoon of the last day of each accounting period, we provide management with a flash report (Exhibit 3) showing the planned and actual sales for the period, gross margin yields, and the approximate operating gain. Also included are the actual figures for the same period of the previous year and the cumulative figures for the year to date, actual against planned and against last year's actual. Obviously, these few telescoped figures involve many intermediate computations daily. That is another story for another day, but a few helpful hints about it may be given. Our budget projections provide yardsticks which have proved reliable with respect to general selling, administrative, and distribution expenses. Hence, for purposes of this quick operating story, the budget figures are used, adjusted for known significant items developed by simple perusal of the disbursements journals or from any unusual item clearing through the accounting departments during the period. Comparison of actual against planned volume of activity flowing through the production departments, the deviations from standard or normal hourly outputs as developed from Exhibit 2 and any known major unbudgeted expenditure for plant maintenance, operating supplies, etc. give us a pretty reliable idea of production cost variances. Put them all together and the end result is a quick operating tabulation which has proved itself satisfactory during the two years it has been in use.

Another monthly report concerns sales performance, (Exhibit 4), which summarizes the cumulative sales production by territories serviced. "Production" in this sense is interpreted to mean not only the dollar volume of merchandise sold but the margin yields achieved in the territory, the expense outlays in maintaining the sales representative in the area, and the net contribution of the territory toward the defraying of general administrative and distribution costs. This data is compiled both as to total dollar contributions and percentage contributions, as trends in both may be significant and one without the other is incomplete. Detailed monthly comparisons with planned accomplishment, broken down by product line and distribution areas, are also developed as refinements of this broad summation. From them we know what we have sold, where we have sold it, who is buying what lines, who is *not* buying what, who is "tailing off", and who is "building up". The chain is almost endless and can be followed as far as need dictates.

As a by-product of the machine posting of customer accounts receivable, we

MONTHLY OPERATING SUMMARY

	January '56 Plan	January '56 Actual	Jan. '55 Actual	February '56 Plan	February '56 Actual	Feb. '55 Actual	2 Mos. '56 Plan	2 Mos. '56 Actual	2 Mos. '55 Actual	March '56 Plan	March '56 Actual	March '55 Actual	3 Mos. '56 Plan	3 Mos. '56 Actual	3 Mos. '55 Actual
Sales															
Gross Margins															
Oper. Gain															

EXHIBIT 3

SALES PRODUCTION

Territory	Salesman	Sales Planned	Sales Actual	Gross Yield	% of Sales	Direct Terr. Exp.	% of Sales	Net Contr. To Overhead	% of Sales
1	A.								
2	B.								
Total									

EXHIBIT 4

obtain a running record of total dollar sales and of unit sales by major product groups. By noon of the second working day of each period, a detailed tabulation by major customers and by sales territory is in the hands of sales management. Approximate grand totals for each territory can be reconciled against the figures otherwise developed and available in rough that same day and in final form two days later. We do not use punched cards or tabulating equipment. Twice in the last four years, our needs and procedures have been reviewed by qualified systems people. The result has been minor refinements and confirmation of existing practices.

The final so-called "gimmick" is not so much in this category as it is a summary of personal review by the chief financial officer of the current results, with a capsule presentation of the facts developed, signficance and trends indicated by them, and suggestions or recommendations concerning the unfavorable items. This investigation and analysis comes at the end of the line on the periodic closing of the books. The timetable, pretty generally adhered to, calls for siphoning out significant data as available and completion of the final formal statements and this analysis by the sixth working day. Generally, the review includes chalkboard outlines of salient operating data. Charts are used infrequently, perhaps because our board of directors is small and close-knit, perhaps because they are allergic to the graph type of presentation.

We Meet the Challenge at Our Volume Level

The devices described here are not offered as a complete "package" but as specimens constituting a cross-section of control devices found pertinent for our operation and utilized according to need. No part of this presentation has been very profound, perhaps not even new. It does, I hope, indicate that the sensible reaction to the challenge of electronic equipment from those who cannot utilize it should not be panic but an organized and orderly program of constant review and inquiry into existing procedures, methods, reports, forms, etc., and of arrangements for effectuating changes when adopted. Electronic equipment is no Moby Dick who is going to swallow up everything and anything in sight. It is more of a St. Bernard bringing, not a cask of brandy but the stimulus of tough competition to be challenged and met, of actually increased opportunity through the enhanced purchasing power of the people employed in companies which can utilize such equipment. It is here to stay. Let us accept it for others —if we cannot use it ourselves—make room for it gracefully, and live with it, all the while keeping an eye out for the day when it may work directly for us, too.

Where the Plant Team Finds Profit Improvement

by HENRY R. SIEBACH

Product Engineer, New Products Div., Corning Glass Works Co., Corning, N. Y.

An impressive number of promising and thought-provoking areas for realization of improved results, profitwise, are tapped under the orderly and comprehensive procedure here narrated, which has the special features of being continuous, thorough, dedicated to teamwork, and scaled to company interest at all levels on which the profit improvement plan operates.

IN OUR COMPANY, a profit improvement program is one designed to increase the gross margin of the division and the company as a whole. The program originates with the division controller. The division manager, who is usually a vice-president of the company, triggers the enthusiasm for the profit improvement program through the plant managers and division department heads. At the beginning of the year, each of these officials submits to the division manager and controller a list of projects which may increase the profit of the particular plant or department for the coming year. The source of the list lies, in each case, with a team consisting of the plant accountant, production superintendent, industrial engineers, quality control supervisors and production control supervisors, the members of which submit possible profit improvement projects to the plant accountant and plant manager.

Profit Betterment Opportunities in Plant Performance

The plant accountant works closely with each member of the team and calculates probable savings which may result from the proposed projects and translates the effects into the additional profit which should accrue to the plant. In addition, the plant accountant analyzes sales for low-margin items, red margin items and slow moving items, considering them in the light of volume. He concentrates on items expected to show gain in volume and margin through the improvement of production methods. The accountant looks particularly at margins on low-volume items to see if there is any way that they can be produced more economically. He also checks for nuisance items which disrupt the manufacturing schedules.

Working with department heads throughout the plant and with fellow members of the plant manager's team, the accountant reviews standard costs,

checking with the research and engineering staffs for new methods of production and for labor-saving devices which may eliminate some operations or consolidate others. He may note that better selection or better quality is needed or where more men are carried on a particular crew than the standard cost allows. He checks with the maintenance department for expected improvements in the control of maintenance costs and better utilization of present equipment. He also checks with sales managers to see whether or not old items or red-margin items can be dropped from production or sales prices increased to make them profitable to manufacture.

Members of the team continuously work with the plant accountant to gather the necessary data to aid him in making realistic calculations. Inventories are checked for items with the greatest sales activity. It is determined whether or not maximums and minimums for stock schedules are being observed for finished items, in process items, parts stores items and materials and supplies. Velocity of in process inventory movement is checked to determine whether an existing high or a low inventory in such items is warranted. The team working with plant industrial engineers checks to see if better methods of production are available, listing improvements that may be made in the flow of material through work centers to create greater volume at a lower cost per unit. The production control unit is contacted to determine that machines are so loaded as to obtain maximum use of equipment, to check schedules of "economic runs," to check the use of inventories in sales forecasts, and to prevent peaks and valleys in production.

Profit Betterment Through New Products or Equipment

The plant manager, the production superintendent and the plant accountant check with the research department to find out whether new products may be added to the production schedule of the plant for the coming year. Sales departments are also checked for new items which may be manufactured for sales in the new year. The plant accountant determines what additional gross margin the new products will add to the plant margin. He then goes to engineering and production staff with his figures. In the production of new products, tolerances play a vital factor in determining the profit or loss on the product. When a new product is difficult to manufacture, it has been found that a slight change in tolerance may change the difficult chore into a product easy to manufacture. It has also been found that by tightening tolerances on certain items, better quality and better selection has been achieved.

At another and higher level, plant managers are constantly checking the development department for better and improved machinery which will lower the cost of the product. Machines which combine operations and take less downtime for tool set-up and change-over are constantly in demand as plant managers work to show a gain in the margin picture of their plants. Machines of standard designs for standard products, for better tool changes, for volume needed, for mechanizing hand operations, for combining operations, for less maintenance costs, for the use of proper tools related to the job and for use of spare machines where possible, are determining factors in showing profit improvement.

Profit Betterment in Packing, Warehousing and Shipping

The service departments may also yield profit improvement. Perhaps the stores department is carrying too much inventory or not carrying enough. The industrial engineers seek out improvements in paperwork and distribution of supplies and follow up on these.

The packing materials department is analyzed for possible changes in design of packages, changes in paper weights, etc. Design changes may mean the difference between a profit or a loss on an item. Package engineers check designs for standard parts to see if less material or lower cost material can be used. They also look for more efficient packaging methods to reduce labor costs. (One division has found that by constantly improving designs, paper weights, etc., it has been able to increase its margin by $50,000 a year on packing material costs alone.)

The shipping and warehousing department is analyzed as to whether all shipments are being made on time and to determine the lag between the time the order is received and the time the order is shipped. This department is also checked to see if goods are lying on the dock, waiting to be shipped, or if a minor item is holding up a major shipment.

Warehousing, shipping and handling procedures are also gone over to determine whether handling distances and time in process can be reduced. Further, the possible increased use of conveyors, skids and pallets in storing and car loading is considered. (By additional mechanization through the use of conveyors and lift trucks, savings in warehousing costs added $100,000 to the margin of the company in one year.) In cases in which space and machines are at a premium, substantial savings may be made possible by the use of two- and three-shift operations.

The billing department may show on investigation that a lag in billing is holding up additional accounts receivable from being recorded or that order

PROFIT IMPROVEMENT PROGRESS REPORT (DEPARTMENT TOTALS)

To: Plant Manager
cc: Division Controller
Division Manager
From: Plant Accountant
Plant Industrial Engineer

Subject: Profit Improvement Program for the Fourth Quarter of 1956

Date: January, 1957

The following table summarizes the status of the individual profit improvement programs for 1956

	Estimated 1956 Savings	Actual 1956 Savings	Number of Projects Total	Completed	Added
1. General Stores and Receiving Department	$ 30,000	$ 28,000	6	5	1
2. Packing Material Department	60,000	54,000	9	7	2
3. Shipping and Warehousing Department	33,000	36,000	7	6	1
Totals	$260,000	$245,000	40	28	12

EXHIBIT 1

entry on the books is being delayed. Standardization of forms and flow of paperwork are checked throughout. Savings in some departments, of which billing is a good example, are sometimes difficult to evaluate. Nevertheless, projects with intangible savings should not be neglected in a comprehensive program.

Concrete Goals and Specific Accomplishments

At following meetings of the plant team, all ideas and methods for completing the profit improvement program are presented to the plant manager. The plant accountant verifies the additional profit margin of the projects submitted. After margins have been verified and the goals set, the program is presented to the division manager and division controller for analysis and approval, stressing the following points:

1. Description of the project.
2. Time necessary to complete it.
3. Margin improvement expected.
4. Cost of making improvement.
5. Availability of manpower.

A periodic progress report on the profit improvement program is issued by the plant accountant and the industrial engineer to the plant manager, division controller and the division manager. This report is issued quarterly. It con-

DETAILS OF PROFIT IMPROVEMENT PROGRAM
GENERAL STORES AND RECEIVING DEPARTMENT

Summary		Annual Estimated Savings	1956 Estimated Savings	Actual 1956 Savings
1 -	Take over Safety Storeroom	$ 5,000	$ 5,000	$ 5,000
2 -	Mechanization of paperwork	4,000	1,000	500
3 -	Order delivery of office supplies	8,000	8,000	6,000

Details of P. I. P. Projects

1 - The functions of the Safety Storeroom were taken over by the department on January 3rd, 1956, at no additional increase in labor forces. This move resulted in the saving of one male storekeeper plus one female assistant. Project completed.

2 - Plans to simplify some of the record keeping and turning over some of the manual paperwork to tabulating equipment are in progress. The machines have been purchased and one former clerk-typist was transferred last November.

3 - Order delivery of office supplies is now in effect. Former waiting time by scores of secretaries to get stationery, ink, pencils, etc. has been eliminated. One delivery man has been added to make deliveries to the various offices. Approximately 6,000 waiting hours have been saved.

EXHIBIT 2

CENTRAL PLANNING DEPARTMENT PROJECTS FOR WHICH SAVINGS AMOUNTS CANNOT BE DETERMINED

The following profit improvement projects for the Central Planning Department are difficult if not impossible to evaluate in dollars and cents, but all of them point to a more efficient organization.

1. Improve service factors on premium and emergency contracts by ability to move more rapidly. This has been accomplished.

2. Refine and expand interplant broadloads. Expected to be completed during the first quarter of 1957.

3. Establish better office procedures. In progress.

4. Better coordination between accounting offices and this department. Continuing progress expected in 1957.

5. Investigation into partial machine operations and its effect on marginal business. This is in the preliminary stages.

EXHIBIT 3

sists of a summary page which lists the savings to date for each department together with the total number of projects worked on, the completed projects, and the projects added during the quarter (Exhibit 1). It is supported by a detail of the individual projects worked on in each department (Exhibit 2). A special section of the quarterly report is given over to a review of projects it is not possible to evaluate in dollars and cents but which contribute to a more efficient organization (Exhibit 3).

Checkpoints for measuring the program are kept very simple because management knows that there must be complete delegation of responsibility and that elaborate control mechanisms to measure accomplishments can paralyze initiative. However, through the reports described, management is enabled to know the areas in which profit improvement programs offer the most profitable results and how these can be achieved, and to know further that they are being achieved.

Discovering the Best Sources of Profit Improvement

Plant managers have discovered that profit improvement programs can be accelerated not through a system of cost reduction but through the constant introduction of new ideas, new products and better methods of production. They realize that profit improvement can best be obtained by improving the efficiency of the worker, the plant, layout, the equipment, and the better coordination between service departments. They have found that, as a result of improved productivity and sound utilization of labor and material, the profit per unit of product is increased. They further discovered that an effective profit improvement program requires an effective analysis of all cost factors, from improvements in manufacturing techniques, methods and processes to the use of new materials and the proper purchasing of all materials.

An Experience in Profit Improvement by Defect Prevention

by JACK D. HARBY

Superintendent of Spectacle Frame Mfg. Div., Bausch & Lomb Optical Co., Rochester, N. Y.

Production losses in industries manufacturing to close tolerances (or even to fairly close tolerance) may run heavily to defective product. The present article describes a well-defined approach by which causes of excess "defectives" were tracked down and eliminated by studies of operations, to which engineers and production management mainly contributed, although the factory accounting department is represented on the "steering committee" involved.

IT IS THE AIM of this article to outline the story of an effort labeled defect prevention by our company and other companies which have undertaken this method of improving operations. Neither the story nor the approach are unique but considerable interest has been shown over the past few years in this type of program, not only by those interested in statistical quality control but also by those engaged in all phases of industrial management. Particular interest has been shown by members of the financial division of our company because of the potential impact of success in this effort upon the profit statement. It poses the possibility of saving sizeable sums of material and labor dollars attended by only modest expenditure of engineering and management money. Let us hasten to add that this entrancing possibility is present only in industrial situations in which one faces the problem of relatively high losses attendant on making, finding, and repairing defective parts or assemblies. Unfortunately, this particular situation faces all too many companies in industry.

It would be well to state that the viewpoint of the writer is neither that of the accountant nor the statistical quality control expert. His participation has been successively as an industrial engineering superintendent and the head of a manufacturing division. Therefore, the material which follows will be of general management interest rather than in technical detail. Nevertheless, accountants will find interest in the story, because it exemplifies a meeting ground for the engineer, the accountant and the line supervisor in a team effort aimed at turning waste dollars into profit dollars. Eliminating waste increases profitability much more quickly and at much less capital risk than expanding the size of a business.

The Strategy of the Approach

A five-point list of essential steps will depict the strategy of the defect prevention approach to greater profits:

1. Evaluate for the division of company under study the total cost of making, finding, and repairing defective parts or assemblies. In other words, evaluate the cost of operation which is beyond that which would exist if there were no defectives produced.
2. The sum established above represents the maximum potential gain from defect prevention, obviously one which will never be reached. However, a reasonable target may be established and experience to date has shown that one half of the total so established is readily recoverable in an operation that is ripe for this approach.
3. Classify the kinds of defects which are represented in the above cost. Establish data or analyze existing data to determine the most important defects from the standpoint of frequency and, where possible, cost.
4. Establish prime targets from the above for preventive effort which will produce the most return. With the use of quality control techniques, find out where the defects are occurring in the process. Determine by experiment the cause and take appropriate measures to eliminate.
5. Set up adequate means of scorekeeping. These should be in terms of units for engineers and shop supervision and in dollars for other elements of interested management.

The foregoing five steps are simple but none the less potent for their common sense nature in the situation where defective products are costing major sums of money. In our original effort in the precision optics section of our instrument division, the first surprise came in Step No. 1. above where the total annual cost of defectives was computed at $500,000 in an operation requiring about 500 operators. This figure was a summation of scrap, normal losses, excess labor, and the inspection payroll. A recovery goal of $250,000 was set by the divisional team and this figure was met with relative ease after one year of effort.

In Step No. 3., when we tabulated the reasons for rejecting optical components, we had a list of over thirty major kinds of defects. However, analysis showed that four types accounted for 73 per cent of the total loss. By concentrating on these, it was possible to secure maximum returns from the effort expended. The pattern of investigation and corrective action was basically the scientific approach rather than a general pressure program, (which had been tried several times before). More detail of this will follow but, in summary:

1. All investigations were planned.
2. All data was preserved in writing.
3. Experiments were carefully designed.
4. Results were tested statistically before conclusions were drawn.

In the realm of score keeping, Step No. 5, we learned many things, among them, that it was easier to make progress in eliminating defective items than it was to record it in a language which was meaningful to all interested parties. We also found that no one index of progress would suffice in our complex business but that several indicators were necessary. Most important, we learned

that, if significant and dramatic progress could be shown by the several independent indicators, no one worried or haggled over how they should be integrated into one common savings figure. The periodic (quarterly) evaluation of shrinkage in the waste "kitty" was the broadest measure used.

Organization for Study of Defect Occurrence

The actual initiation of the program took place in the instrument division of Bausch & Lomb where most advancement had been made in building up the technical arm of the manufacturing organization and providing the proper climate for joint line and staff effort on major projects. A need was realized by the line organization for a more basically sound approach to reducing losses in the manufacture of precision lenses and prisms. The instrument division established the organizational plan shown in Exhibit 1 for the activation of this program.

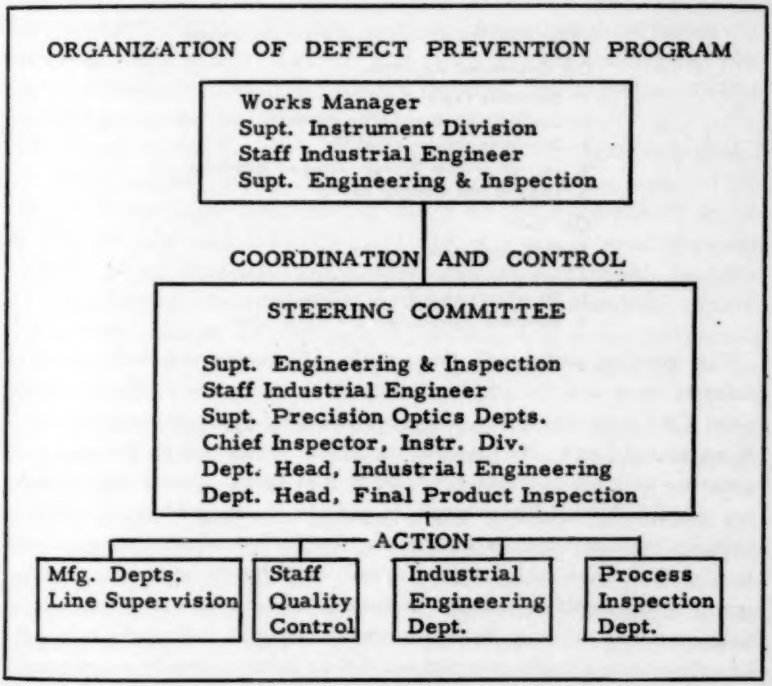

EXHIBIT 1

The review group indicated on the exhibit met on a monthly basis with the steering committee and representatives from factory accounting, product design, sales, and other interested "outsiders." Progress was evaluated and future plans outlined. The review group also furnished a pipeline to top management when approval or endorsement was needed. The steering committee quarterbacked the effort on a week-to-week basis and kept activities in desired channels. It served as a basic communication device as well as a direction center. The action groups cooperated in a task force manner on the work projects as scheduled. One key to successful coordination was making certain that all plans, results and problems were discussed at lower echelons first.

How Investigations Were Carried Out

The basic technique governing the effort is illustrated in the lists below. These lists were used in a meeting with management to explain the operation after a year of successful work. The lists follow:

Our Principal Objective—Defect Prevention

Our Operational Approach

1. Determine cause of defective items
2. Establish objective quality standards
3. Determine process capability
4. Tune-up process through increased knowledge
5. Establish and maintain control

Our Tools

1. Staff engineering organization
2. Scientific method to attack shop problems
3. Statistical techniques to analyze data
4. Maximum coordination and cooperation

The operation started with the analysis of inspection data with respect to defective items and the general location of their occurrence. This is greatly aided if the accounting system embraces a tabulating report for computing actual versus normal losses. We have had the benefit of this type of system in some areas and have had to establish or modify it in others. Once a type of defect was established as a lucrative target, an engineer was assigned to track down its principal point of origin in the process. Specific lots of work were followed through the process and examined at each stage for the appearance and frequency of the defect in question. In the case of some types of defects, special techniques were necessary for measuring the degree of their presence in given lots. Sometimes it was necessary to establish an index of severity in order to obtain meaningful data.

Once the defect had been tracked down to its principal area of occurrence, we became interested in its principal cause. Here the benefit of engineering, inspection, and supervisory experience was used to set up hypotheses as to the cause. Experiments were carefully designed by the quality control group to test these hypotheses and pinpoint the primary cause or causes. When the desired data had been acquired and evaluated, we had information as to the cause based upon facts and not opinion. Once this factual knowledge about the cause was available to the team, it was surprising how easily the cause could be eliminated or its effect greatly reduced.

Two Instances In Which Cause of Defects Was Eliminated

In the early days of this program, one of the major types of defectives on lenses turned out to be edge chips. This defect accounted for 27 per cent of all rejected lenses. At the outset, there were many reasons proposed by supervision, engineers, and inspectors as to the principal causes of chips. Factual investigation started by tracing lots of marked lenses step-by-step through the process and examining them for chips before and after each stage. The resulting data pinpointed a milling operation which surfaced the second side of the lens. During this operation the lens was held in a collet type chuck.

While the investigation was progressing, chips began to significantly diminish. This meant that possibly the cause in milling lay within the control of the operator. It was hypothesized that not seating the lens down properly in the chuck would cause edge chips and that, if this were true, it would also cause wedge in the lens after milling. Experiments were run and the data showed a significant correlation between wedge and chips. With this knowledge, supervision carefully instructed the operators and established daily on-the-spot controls. Later a new type chuck was developed which took the problem out of the operator's hands.

Scratches on lenses were another recurring defect and accounted for about 25 per cent of all defects. During the investigation, it was necessary to set up a good index for scratch severity by which lots of different types of lenses could be judged. There were problems of size, standards for rejection, and other problems which made the integration of inspection data difficult. The quality control group, after testing several indices, finally settled upon the ratio of scratched area to diameter of the lens. This was plotted regularly for random samples from each lot of many types of lenses. Analysis indicated, after several months, that we had a sound correlation between severe damage and a particular test device that was used only on particular lenses. By cutting down the number

of people allowed to use this device and better controlling its use, tremendous gains were made in eliminating scratches.

Benefits Besides Waste Reduction

The defect prevention program at Bausch & Lomb has continued to spread since its beginning in the precision optics section of the instrument plant in 1952. A major effort was launched in the ophthalmic lens plant through 1953 and 1954. In 1955 a start was made in the spectacle frame division. Much could be said about results, which have been very satisfying in all areas. Some of the indicators used are listed below:

1. Periodic re-evaluation of the loss or waste "kitty". Where production levels are stable, this is a good measure for top management.
2. Summarization of credits produced against a fixed set of standard costs preserved at the start of the program as a base.
3. Departmental plots of per cent defective units.
4. Ratios of value of loss goods versus value of inspected goods. This takes the mix factor out of per cent defective figures.
5. Frequency distribution of ordering factors from period to period. These factors in optical work had been exceedingly high.

Other benefits have accrued from the defect prevention program besides the reduction in waste dollars. More knowledge of process capability through these studies has led to valuable reductions in prime costs. Attendant studies of inspection methods and standards have helped to reduce needless 100 per cent sorting operations and to set up more efficient localized patrol-type quality control. Although less tangible, of equal value has been the development of personnel trained to work with factual data and to interpret it in the solution of shop problems. Also, our organization has profited by the climate of teamwork between line and staff and between functional divisions of the company, which such a project engenders.

Accounting Opportunities in Sales and Selling Costs

by JOSEPH M. NAAB

Vice-President, Leslie Co., Lyndhurst, N. J.

The margins yielded by present sales, the productivity of selling expense, the soundness of pricing policies, the effectiveness of customer relationship, and the profitability of diversification of product line, all—according to the author of this article—require for adequate determination a body of information which it is within the normal discipline and duty of the cost accountant to supply. This thesis is heavily illustrated by the numerous suggestions offered in connection with each topic.

IN OUR PRESENT BOOMING economic prosperity, cost cutting and improved efficiency in the field of distribution are generally neglected. Opportunities for greater profits along this frontier are thus relatively unexplored. This highlights a responsibility shared with all major management divisions within a business, i. e., a coordinate, equal responsibility for maximum profits, without the recognition and acceptance of which the enterprise is doomed to ultimate failure. And, within each major department of the business there must be applied, as a common denominator for maximum efficiency and best results, the indispensable tool of cost accounting for measuring performance and profitability. In this article, we shall consider only the need and possibility for greater profit realization in the sales or distribution function through proper application and use of cost accounting principles and tools. Many experts believe the opportunities for savings and efficiency are greater in this area of distribution than in that of production.

Uses and Disclosures of the Sales Budget

The whole business operation is built upon the forecast of sales. If the estimate is sound, reasonably accurate and reliable, the actual operating results will be correspondingly true to projected expectations from month to month and profit can be controlled within remarkably close limits. It serves as the basic guide for material procurement, production scheduling, and overall and inventory financing. Such effective control begets confidence and facilitates the continuous accumulation of monthly profit increments. Any downward trend in

profit margin must be quickly spotted and be given speedy effective arresting action to correct or remove causes of profit reduction or loss. The overall total sales budget for the year should be calculated to a degree of accuracy within plus or minus five per cent.

In the development of the annual sales budget, standard cost accounting methods of sales analysis by fields, by product classifications and quantities, by trade factors, by geographical locations, and by other categories normally considered essential for performance presentations to management should be employed. Basic detailed estimates from which budget totals are determined, should be carefully checked from month to month against actual results, for proof of accuracy and to insure use of appropriate adjustment factors in future forecasts. By this procedure, the usefulness of the basic sales budget for production programming becomes susceptible of constant improvement.

Analysis of Sales Mix for Margin Review

However, the total sales of any going business may well include an excessive percentage of low or non-profit items. The greater the sales total, the more likely this is to be the case. Such a product mix may easily, under pressure of mounting volume, produce a downward profit curve with eventual adverse or even disastrous results. An aggressive sales manager will enlist the services of his company's cost accounting facilities to develop basic information pointing out these essential facts:

1. Segregation and tabulation of sales items not producing satisfactory profit margin.
2. Analytical data by predetermined categories or classifications of these low priced items, for possible elimination from line or price adjustment to satisfactory level.
3. High-lighting of better profit items as a basis for a program of selective selling to promote increased orders in products contributing satisfactory and above-average profit.
4. Sales figures by distribution agencies, by marketing areas, by geographical districts, by types and sizes of customers, by classes of trade factors, by sales representatives, by major and minor products.

The Large World of Selling Expenses—and Their Control

Just as the basic sales budget is the keystone of any successful business operation, so the principle of budgeting should be fundamental in the direction and management of the selling effort. In other words, the complete sales program and activity must be effectively budgeted so that all sales expenses are completely controlled according to a predetermined pattern of expectancy. Obviously, the cost accounting facilities are again a vital element of managerial efficiency in

this area. In fact, the entire sales organization should be indoctrinated with "cost consciousness" and held to strict accountability for performance according to budgeted expense allowances. Where the proper attitude regarding costs of sales activities prevails, there is an amazingly broad scope of operation embraced within the limits of reducible sales expenses, including:

1. Selection, training and preparation of salesmen.
2. Traveling and living expenses of sales representatives.
3. Compensation and incentives for members of the sales organization.
4. Advertising and promotional activities.

It is usually apparent that, in the foregoing fields of endeavor, there is necessarily an over-emphasis on "getting results." By this we mean, getting the job done as quickly as possible, achieving the goal with minimum effort or interference, and usually without regard to cost involved. Here, indeed, is a fertile field for applying cost analysis and developing cost data which can be highly useful in controlling and reducing expenses. A complete historical cost record of each sales expense factor is invaluable for determination of basic standards of expense budgets.

As an example of cost reduction possibility, let us consider the sales training program. Admittedly, it is standard practice in most larger companies to screen sales personnel very carefully and to train them thoroughly. Many smaller companies are also teaching sales representatives how best to represent them in dealing with their customers. But how many sales executives are sufficiently conscious of the rapid changes taking place, both in their own businesses and in those from which they receive their orders? Does this not suggest an urgent need for re-training seasoned salesmen? Periodic instruction geared to prevailing conditions will prevent waste of time and effort on wrong or inept methods of approach. Well-trained salesmen will insure those marginal sales upon which ultimate profits depend.

In the field of traveling and living expenses, the cost accounting department must keep and supply detailed records from month to month of actual outlay against budgeted standards and appropriations. Analysis of data accumulated, when properly presented, should plainly reveal effectiveness of time application by the sales force and pin-point lack of proper time utilization, resulting from use of wrong travel media, poor planning and scheduling or other characteristic inefficiencies. Proper home office direction in this phase of the sales effort can be made to produce substantial profit savings.

Obviously, a fair and mutually satisfactory compensation for the salesman is of prime importance as a stimulant to maximum productive effort on the part of any sales force. If this is so, it is difficult to understand why incentives,

based upon sales totals, are not more generally used in establishing the methods of pay for sales representatives. The effectiveness of incentive pay toward increasing productivity to the advantage of both management and labor in practically every other type of human labor is so well recognized that its mere mention here should initiate immediate activity in direction of increased use of incentives in sales compensation. An axiomatic truth, often stated, that the individual workman produces only fifty per cent of his potential capacity without an incentive, should strongly appeal to the sales cost accounting team as justification for original thinking and effective action along the line of improved sales results at lower cost through application of incentive pay methods to those engaged in selling. Establishment of equitable and profitable sales quotas for company and salesmen is an important part of this phase of a sales expense control program.

The most elusive factor of sales expense is the cost of advertising and sales promotion. How much to spend for advertising is always a moot question. The answer is different for each and every individual business. There is just no standard acceptable formula for even a small segment of any indusrty, much less for any cross section or overall grouping of general business, nor is there any easy way of determining what is the correct amount of money to be budgeted for this item in any one establishment. The proper answer can only be developed upon sound factual historical cost data, combined with hard common sense thinking and proper accrediting of sales to advertising media and methods employed.

Nor should the value of exchanging information as to relative advertising and promotional expenses in identical or very similar types of business through trade association facilities be overlooked. Every effort possible should be made to key-code advertisements and promotional direct mailings and to record all results identifiable in this way. Sales representatives should be trained to cooperate to the extent of reporting periodically all inquiries and sales which they can associate with any form of advertising or solicitation, and indicating to what part of a promotional program, each may be attributable.

Pricing With Knowledge of Costs

As the laborer is worthy of his hire and deserves a fair wage reward, so, in accepting the profit motive as our reason for being in business, we believe that cost plus a fair profit, is the fundamental basis for selling price determination. Our basic idea is to give sound value for fair price. First of all, we must actually know our costs (supplied by the cost accounting function). Secondly, the prod-

uct cost must be the lowest attainable with efficient methods and use of labor and materials (contributed through good production methods and supervision). Thirdly, we must take into consideration relative values offered by competition, value of product to the buyer, amount of profit to be added to overall costs (sales department know-how and administrative direction).

Too many concerns, strange as it seems in these times, are still unaware of their actual costs and, by reason of lack of an adequate cost accounting installation, do not place in the hands of those charged with responsibility of determining selling prices sufficient basic information as to costs of labor, material, burden and overheads to permit of sound pricing decisions. Companies in this situation are at a terrible disadvantage, which becomes doubly embarrassing and can even be ruinous in the face of rapid day-to-day changes in all cost elements. The business volume and volume sales of individual items are important factors affecting pricing policy and must be properly considered by the sales-cost accounting team.

Lost orders may be a blessing in disguise, if properly appraised and utilized. Management should certainly know *why* an order is lost. Such basic information as competitive prices, if delivery was a factor, and all other details explaining why the company did not secure the order should be developed. The lower price of successful bidder should result in restudy of costs and pricing formula, as well as of effect of volume. Prompt and definitive action on such transactions will serve to keep the cost and pricing operations up-to-minute and insure quick changes and corrections where needed and justifiable to obtain future business.

Studies for Improved Handling of Sales Transactions

The cost accounting department can be of much service and help to the sales staff in its every-day dealings with customers and members of its organization. Some of these services may, in particular cases, be removed from a cost accounting unit and embraced in a broader comptroller's or treasurer's department. Nevertheless, they pertain to the general field of accounting and it is considered worth while to mention them here, if only briefly. Here are a few typical items:

1. Assist in market surveys to develop needed information as to potential sales and techniques which must be employed to win them.
2. Develop efficient order-handling procedure to expedite orders, resulting in better service for customers and sales representatives.
3. Handle customer credit rating and terms of sales, as well as collection of past due accounts, including preparation of collection letters which will be effective in collecting accounts but still hold the customer.
4. Provide prompt, comprehensive and completely understandable commission statements for sales representatives.

5. Assist in studies to conserve salesmen's time (both in the field and in the office) and minimize office detail through better procedures, simplified call reports, and better travel routing.
6. Obtain data on competitive practices, competitive prices, and competitive strength and weaknesses.
7. Minimize packing and delivery (including transportation) costs.

Product Diversification, Research and Planning for the Future

It is taken for granted that, in any successful enterprise, there is a fixed, predetermined objective, possibly expressed as an "improvement factor." Let us assume it to be an annual 10 per cent increase in volume. The potential market for this additional volume may not exist. The objective, therefore, must be attained by other means. Product diversification is one form of activity which will be found helpful in this direction. Two basic methods are commonly used, namely:

1. Development and introduction of products utilizing the same basic raw materials, manufacturing equipment, and productive labor.
2. Introduction of products unrelated to present output but sale and distribution of which will fit into the present sales program because such new products would be used by or channelled through present classes of customers and, therefore, would be marketable by the present sales organization.

Preliminary to any such expansion program, it is necessary and desirable to maintain an adequate research staff constantly exploring the foregoing avenues of product change and improvement and of new items practicable of addition to the existing line with least disruption of current operations. Here again, cost accounting must contribute its services. All development and research activities must be strictly accounted for and full project costs maintained for every section or part of such a program. Effective cost control of the product diversification program will be comparatively simple if management appropriates or budgets specific amounts and clearly defines each project. Money will be saved by periodic reports of expenditures versus budget and reliable estimate of per cent of completion attained. Attention is also directed to the need of market surveys to develop advance information as to sales potential for each item of diversified or new product under consideration.

In some businesses, the opinion may prevail from time to time that the interests and responsibilities of sales executives and cost accountants are diametrically opposed. We believe that the ideas here submitted are convincing to the contrary, that the cost accountant's work can be of great benefit to the sales department and can serve to improve sales results, thereby producing greater profits.

Integrating Sales Analysis With Job Pricing and Billing

by DAVID F. JOHNSON

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A "small company" narrative, this paper describes how a firm in the printing industry provides its management and its routine accounting with adequate sales analysis under a pegboard program tied to the pricing operation. A feature of the method is that it operates to detect initial errors in pricing and also errors in extensions on invoices.

THIS ARTICLE IS CONCERNED with the development of a system for sales classification for a medium-sized printing establishment where it was not considered feasible to apply electronic or punch card equipment to the problem and where the requirements, as far as the amount of detail was concerned, were beyond the capacity of a general accounting machine. The information produced by the analysis was to be used for two different purposes: statistical analysis of product sales and distribution of sales credits to production centers. There is no question that, with the continuing development of machine accounting, electronic computers, and punch-card analysis systems, the amount of detail which can be provided for any classification problem is almost unlimited. However, in small and medium-sized companies the application of such equipment or systems may not be considered practical because of cost, particularly if the equipment is not already in use for other functions. The analysis of sales in terms of product classification is required by management in almost every company engaged in the manufacture or sale of more than one product or service. Three basic factors enter into the amount of detail which it is appropriate to present in the analysis:

1. The amount of product diversification.
2. The amount of information required by management.
3. The cost of preparing the analysis.

It would be foolish, of course, to prepare a very detailed analysis of sales unless the information finally presented is to be of actual service to management. Certainly the preparation of information which is required should not be accomplished in any more costly manner than possible, nor should the amount of information prepared be reduced below the desired level because of cost of preparation, if an alternate means of preparing the information at lower

cost is available. The balancing of the two elements of amounts of information prepared and cost of preparation is a problem to be solved within each organization.

Product Groups

Our objective was to obtain figures for the volume of sales in each category of printing and paper sales, expressed in terms of number of items (jobs), number of impressions, and dollar volume. The company has three major product groups: letterheads, envelopes, and miscellaneous stationery forms. Printing is done by three different processes: engraving, lithography, and letterpress. Some additional functions are performed by a bindery department. Within the engraving process, there are four subdivisions, within the lithograph process there are two, and within the letterpress area there are subdivisions to differentiate printing operations and operation which produce effects, such as scoring and panelling. It was also desired to separate the volume of sales of paper for stationery items to be printed by either the engraving or letterpress processes and the volume for stationery items to be printed by lithograph process. In total there were approximately 170 different figures to be accumulated for the final analysis. The remainder of this article consists of a present-tense description of the procedure which was developed.

Use of the Price Worksheet

The sales departments price worksheet is used to provide a source for the basic information required for the analysis. This is possible because a complete knowledge of the production requirements of each item to be printed is required in the sales office where the price for each item is computed by combining the prices for the various elements of the job from a master price list which covers the various processes in various editions as well as charges for special requirements of jobs, such as color, special bindery functions, etc. However, because trade custom considers the delivery of a quantity 10 per cent above or below the nominal quantity ordered as acceptable delivery—it is desirable in providing for proper distribution of sales credits to the production centers, to value the orders on the basis of invoices rather than orders as entered. Using the information prepared by the sales office, presented in suitable form, eliminates the necessity for other personnel to review the requirements of each job at a later date to develop the information required for the statistical analysis.

PRICE ANALYSIS WORK SHEET

Job.....

Stock.....

.....

ORDER NO.

Cost _____
Kind _____
Size _____
No. Out _____
No. On _____
Quantity _____
Run _____

DATE _____
Est. By _____
Approved _____
Com. M. _____
Salesman _____
Quoted _____
By _____
For _____

	A		B		C	
			IMPRESSIONS		AMOUNT	
	PER M		ENGR.	ROTO.	ENGR.	ROTO.
Paper						
Folding			B-1	B-2	C-1	C-2
Cutting						
Handling			PRIM.	SEC.	PRIM.	SEC.
Photo.						
Grav.						
Tint						
Die						
Ink						
Pad						
Bind						
Tissue						
Fold						
Perforate						
Mark up						
TOTAL						
DISCOUNT						
CONCESSION						
NET PRICE						
LAST PRICE						

EXHIBIT 1

The detailed Price Analysis Worksheet developed to cover the requirements of both the pricing function and the statistical analysis is shown as Exhibit 1. It is to be noted that some individual items are included in the form principally for the convenience of the sales office in the pricing job. The prices

for such items may be combined with others at the time the statistical analysis is prepared but basically, the prices as recorded by the sales office, will be used for extension purposes for the analysis. The worksheet is designed for use on a peg-board. This was done by punching the top of the form to coincide with the spacing of the pegs on the board. In addition, a flap was provided at the right side of the form to provide for expanding the capacity of the board by exposing a second set of columns for analysis when the flap had been folded and turned back under the form itself.

At the time of pricing, the upper portion of the form is filled out, identifying the customer and order number. Miscellaneous information required for the computation of the price, such as type of paper, size of form, length of press run, etc., are noted. This information is required by the sales office for purposes of price computation but does not enter into the statistical analysis. The price for each element of the job, expressed in terms of price per M, is written in the column provided, Column A in the exhibit. The worksheet accompanies the formal production order entered to the production control office where it is retained with other material pertaining to the order until the order has been produced and shipped and is ready for invoicing. The material is then forwarded to the billing clerk for preparation of an invoice.

When the invoice has been prepared, the billing clerk indicates on the worksheet the exact quantity shipped and invoiced for each individual item printed. This notation is made at the head of Column A. The sheet is then sent to a statistical clerk. He extends the dollar value (in whole dollars) for each element of job, in the columns under the heading "amount," designated as Column C. It is to be noted that there are two sub-headings in this column to provide for the separation of the dollar amount into two categories for paper sales and two categories for printing sales. Paper sales are appropriately entered in either of the columns headed "engr." or "roto," depending on the process used in printing the item of stationery covered by the particular price analysis worksheet. When the stationery has been printed by the engraving or letterpress process, the paper sales are recorded under the heading "engr." When the stationery has been printed by lithograph process, the paper sales are recorded under the heading "roto."

Printing prices are extended into columns having sub-headings "primary" and "secondary." The primary impression on each job is considered to be the dominant element. Secondary impressions are supplementary impressions or imprints added. An individual form has but one primary impression but may have any number of secondary (supplementary) impressions. It is necessary to record the number of impressions produced, in terms of even thousands only,

in the columns under the "impressions" heading, designated as Column B. The quantities are recorded for each element of price under the sub-headings of "engr." or "roto" and "primary" or "secondary" to correspond with the selection of column for dollar amount.

Obtaining the Page Totals

Each sheet is marked in the upper right corner on one of the lines under "order no." to indicate the major product group in which the item is to be classified. The letters, L, E, and M, are used to designate categories of letterheads, envelopes, and miscellaneous sales, respectively. When a sufficient quantity has accumulated for any one of the groups, the forms for it are arranged on the peg-board, being shingled so as to expose only the flap of the form on which the amount columns appear. Two blank forms are first placed in order at the extreme right of the board to provide for total sheets. One of these is to provide for the recording of totals of the "amount" and "impressions" columns, the other is to provide for a count of the items to indicate the number of times a particular element of pricing was used.

The horizontal bar used with peg-board to provide for the convenient reading of figures across the board when accumulating horizontal totals is provided with a sliding panel in which a series of cutouts have been made. The width of the cutouts corresponds to the width of a single sub-column of the form. The solid area between cutouts also corresponds to the width of a sub-column. When the slide has been placed over the forms, the figures appearing in each pair of subcolumns then can be separated from those in the other pair. A rotary calculator is used to accumulate the amounts recorded in the "amount" and "impressions" columns, since each time a figure representing an amount is entered in the machine, the machine will automatically provide for a count of the items in the upper dial of machine.

Starting at the top of the form, the clerk adds the dollar value recorded opposite each horizonal heading (line caption) designating the various elements of paper and printing. The total for each line is recorded on the total sheet for items. The total sheets prepared at this time are designated as "page total sheets." When all items have been totalled for the sub-heading "engr." the slide is returned to the top of the page and the sliding panel positioned so as to expose the columns headed "roto." The clerk then proceeds to take totals in the same manner.

When the amounts recorded in both subcolumns under the "amount" heading have been thus totalled, the slide is withdrawn below the bottom of the sheets to

permit the folding under of the flap. The form has been lightly scored at the time of printing to provide for easy folding of this flap. The cutout in the upper right corner of the form permits the flaps to be turned under without removing them from the board. When all flaps have been thus folded back, including the flaps on the page total sheets, only the columns under the heading "impressions" should be visible. A glance along the level corresponding to the top of the flap is made to assure that all flaps have been folded under. Any flap which has not been folded under will be readily spotted by the dark cross-hatched area printed at the top of the flap.

The clerk proceeds to obtain totals for all of the items in the "impressions" columns, following the same procedure used for the "amount" column totals. Then, before removing the forms from the board, he makes a visual comparison of the figures recorded on the item total sheet. The figures recorded in the "impressions" columns on this total sheet should compare with the figures recorded in the "amount" columns on this same total sheet. If the figures do compare, it is assumed then that each item for each individual price worksheet has been taken into consideration in both the totalling of impressions and dollar amount. If the figures do not compare, the clerk returns to check the figures on the line in question. This check, of course, does not prove the accuracy of the clerk in entering figures on the keyboard of the calculator, but it does prove that no item has been omitted from either the amount of impression columns which has been taken into consideration in the other.

As additional invoices are processed during the month, additional forms are shingled onto the board and page total sheets prepared. At the end of the month, there are six different groups of these sheets:

Amount:	Letterheads	Items:	Letterheads
	Envelopes		Envelopes
	Miscellaneous		Miscellaneous

Obtaining the Summary Figures

Grand total sheets are now accumulated for each of the six groups, following the procedure used in accumulating the totals for the individual page total sheets, shingling on to the board the page total sheets for only one of the groups at a time. An item proof sheet is placed on the board in the same manner as the page total item sheet used when the individual worksheets were accumulating the grand total. When this fact has been verified, the proof sheets should be discarded, since they have no value for reference.

A summary sheet is now prepared from the figures on the grand total sheets, combining the totals for various elements, where appropriate. The summary

SALES ANALYSIS SUMMARY SHEET

			No. Items	Number of Impressions	Dollar Amount
Paper					
	Engr. / Type				
	Litho				
Engraving					
	Photo	Prim			
		Sec.			
	Grav.	Prim			
		Sec.			
	Tint	Prim			
		Sec.			
	Die	Prim			
		Sec.			
Lithograph					
	Roto	Prim			
		Sec.			
	Litho	Prim			
		Sec.			
Letterpress					
	Printing	Prim			
		Sec.			
	Other				
Bindery					
Discount and Concessions					

EXHIBIT 2

sheet provides for recording the information displayed in Exhibit 2. The total of the dollar amount column of the summary is compared with the total of invoices for paper and printing for the month. When any credit memos or other adjustments to sales invoices have been taken into consideration, the totals should compare.

Sales Information Economically

In addition to the statistical value of the figures prepared in the summary, credits to be allocated to production centers are computed from the figures presented. The procedure of computing the dollar value of each individual price

worksheet also serves as a means of verifying the accuracy of the billing clerk in preparing invoices, since the statistical clerk can compare the total dollar value obtained on individual price worksheets with the amount invoiced for a particular item on the copy of the invoice which is made available for this verification. Errors by the sales office in totalling the individual price elements into a single price per M for any item of stationery are also disclosed in this procedure.

The application of the peg-board form in this particular instance provides for the preparation of all of the information desired for product analysis, at a cost consistent with the value of this information. The procedure is such that the work may be accomplished as invoices are processed, without holding up any flow of paper. The statistical work can be done in various stages as time permits and may be assigned, when appropriate, to clerks with free time available, in the event of an uneven distribution of workload at any time.

Why Not Use the Break-Even Chart More Freely?

by RAYMOND W. ANDREWS

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Well known as the break-even chart and attendant analysis have become in recent years, it is not correspondingly clear that small and medium size companies have singled this graphic tool out by itself as one for informal and repeated use to communicate the likely effects of existing and prospective situations. This refresher on the theory and construction of break-even charts on a practical basis for practical purposes, implies that such charts are handy for the accountant to prepare (if assumptions are made clear) and for management as a whole to study.

MANY AIDS OF A BASIC nature have been developed to help the planning and controlling of business functions. Many of these aids are the result of a scientific approach to business developed by accountants and the accounting profession. Yet, they have not received the complete acceptance of management because, in most instances, they have not been clearly distinguished from merely historical data. However, there is one which embodies much-needed information to control costs, predict future profits and, more important, aim for higher profits. This is the break-even chart or analysis, with which this paper concerns itself. Most companies may imagine they already have or know their break-even points but, ordinarily, they know it only in terms of what has happened. Much more information can be obtained from the break-even approach. Such charts can be very flexible, easily established for each company and adapted to changing conditions.

An Economical and Revealing Instrument

A properly presented break-even report will disclose the inadequacy of a complacent acceptance of things as they are and, as to improvement, will show that increased volume of sales alone will not solve all problems. A break-even chart can be adapted to reveal profitable, less profitable and unprofitable sales combinations. Most important, it serves the basic need for bringing to light the necessity and importance of controlling costs. What then—in cases in which it is not utilized—are we waiting for? The basic analysis can readily be prepared

from information already at hand. It does not require added accounting department costs. It does require proper preparation, presentation, and interpretation. It must "say" clearly what it means, e.g., what costs and profits should be at varying levels of sales, what effect increased costs will have on current sales volume, what the profit margin should be on annual sales volume, what portion of that profit margin is required for income taxes, dividends, or working capital, show drastic difference in profit factor relative to fixed and variable costs. In one instance, the chart was used as a basis for establishing a salesmen's incentive or bonus. It had been the practice to pay bonus on volume of sales over a budget but that alone proved a poor device when the sales were not being made at as high a profit margin as was expected. The preparation of a break-even chart graphically brought this fact out. To go back to the general discussion from these particulars, management should know—and the break-even chart can tell—profit projection well in advance, in order to properly plan the company functions for a coming year. The prospective facts should be known before historical facts are yet to occur. From the chart projection, much can be determined, e.g., the economics of a potential new product, whether capital equipment replacement is feasible from a cost reduction point of view and whether future costs are out-of-line. In other words, facts concerning operations can be forecast in advance of their happening and can be looked at best through the "window" of break-even analysis, no matter the company's size. One instance comes to mind of the ability of an accountant, alert to a client's condition, of being able to prepare a break-even analysis of a competitor, once he had obtained its financial statement, to the direct advantage of that client.

Costs, overall, do not vary with sales and continue without them. This fact becomes one of the underlying concepts to the understanding and presentation of a break-even approach. It can be expressed mathematically but is best understood graphically. No matter which presentation method is used, certain assumptions have to be made—such as:

1. That costs, whether manufacturing, selling, distribution, administrative or general should be analyzed as between those that are fixed and those that are variable.
2. That fixed costs will remain constant.
3. That variable costs vary in a constant ratio.
4. That sales volume remains constant as to mix and price.

There may be other factors or assumptions necessary to completely understand the presentation which, if they are not made, will distort such presentation. When basic assumptions change a new chart is necessary. It must be assumed that production follows sales, that the efficiency of direct labor does not vary, and that any particular result shown will not be true if price changes occur.

SEGREGATION OF EXPENSES TO FIXED AND VARIABLE (PRACTICAL BASIS)

Manufacturing or overhead expenses	Fixed	Variable
Maintenance labor	X	X
Maintenance material	X	X
Payroll taxes	X	X
Fuel	X	X
Power	X	X
Freight		X
Equipment rental		X
Truck expense	X	X
Factory supplies		X
Electrical supplies		X
Janitor supplies		X
Supervision	X	
Laboratory expense	X	
Depreciation	X	
Municipal taxes	X	
Insurance - Fire	X	X
Insurance - Group and compensation	X	X
Delivery expenses		
Purchased delivery		X
Loading labor		X
Drivers wages		X
Maintenance labor	X	X
Maintenance material	X	X
Gasoline		X
Scheduling labor		X
Supervision	X	
Equipment rented		X
Depreciation	X	
Municipal taxes	X	
Insurance-Liability	X	
Insurance-Group and compensation	X	

Selling expenses	Fixed	Variable
Supervision salaries	X	
Salesmen salaries and wages	X	X
Travel expense	X	X
Automobile expense	X	X
Advertising	X	
Commission expense		X
Engineering and professional services	X	
Postage	X	
Telephone		X
Supplies		X
Taxes on payroll	X	X
Insurance on payroll	X	X
Administrative expenses		
Officers salaries	X	
Clerical salaries and wages	X	X
Taxes on payroll	X	X
Insurance on payroll	X	X
Depreciation on equipment	X	
Municipal taxes	X	
Travel and entertainment		X
Postage	X	
Office supplies		X
Legal and accounting services	X	
Bad debt and collection expense		X
Public relations		X
Contributions		X
Business insurance		X
Interest on borrowings	X	

EXHIBIT 1

A Review of Cost Segregations and Chart Structure

One of the most difficult problems affecting the establishing of data to be presented for a break-even analysis is the detailed break-down of costs. Not only is a detail of costs necessary but also the determination of which costs are fixed and which are variable. Many costs have elements of both categories in them. However, for the first attempt at this determination, a practical approach should be tried. Experience may reveal a more proper evaluation but, for a beginning, facts at hand will usually be sufficient to construct the first chart and to illustrate to management the information to be gained from such a report.

This presentation uses our company as a basis without, however, using actual figures. It is a manufacturing operation with a modified standard cost. We prepare segregation of costs between fixed and variable items with full knowledge that some of the costs are difficult to classify and many have a dual nature. Exhibit 1 illustrates the items of fixed and variable costs in the various categories of expense. Exhibit 2 is, basically, a forecast profit and loss statement. (The amounts are as budgeted.) For purposes of this discussion, cost of sales, it will be noted, includes only direct materials and labor, with manufacturing expenses included in other costs. Our break-even chart comes by plotting this forecast profit and loss statement, as in Exhibit 3.

FORECAST PROFIT AND LOSS STATEMENT

Sales			$3,000,000
Less Cost of Material and Direct Labor			850,000
Gross operating Profit			$2,150,000
Other Costs	Fixed	Variable	
Manufacturing Expenses	$180,000	$440,000	
Delivery Expenses	120,000	360,000	
Selling Expenses	150,000	30,000	
Administrative Expenses	250,000	50,000	
Total Other Expenses	$700,000	$880,000	$1,580,000
Forecast profit before taxes			$ 570,000

EXHIBIT 2

The bottom vertical line represents the months of the year, while the horizontal scale shows the dollars of costs and sales in units of $100,000. The plotting of the Line A for sales from zero in the left hand corner to the estimated sales of $3,000,000 at December 31 presupposes that monthly sales will follow it. When a monthly sales chart is superimposed on this break-even chart, the differences that may occur are more vividly expressed. Line B represents the total fixed costs from Exhibit 2. When Line C, which represents total costs of material, labor, fixed and variable expenses, is plotted, the chart begins to present items of interest and interpretation. First of all, the break-even point becomes apparent. This point is reached when sales volume approximates $1,700,000. If sales volume remains constant, this point, the first appearance of profit for the year, will not be attained until the middle of July in the projected year's volume. Until that date, accumulated profits (year basis) will be a minus amount. The difference between Lines A and C becomes the forecast profits for any period after the break-even date. The horizontal scale on the chart could also be adapted to represent units of volume sales instead of calendar periods. In such an instance, assuming the unit selling price was one dollar, the break-even point would not be attained until 1,700,000 units had been sold. The difference between Points A and C at December 31st, or $570,000, is the forecast profit potential.

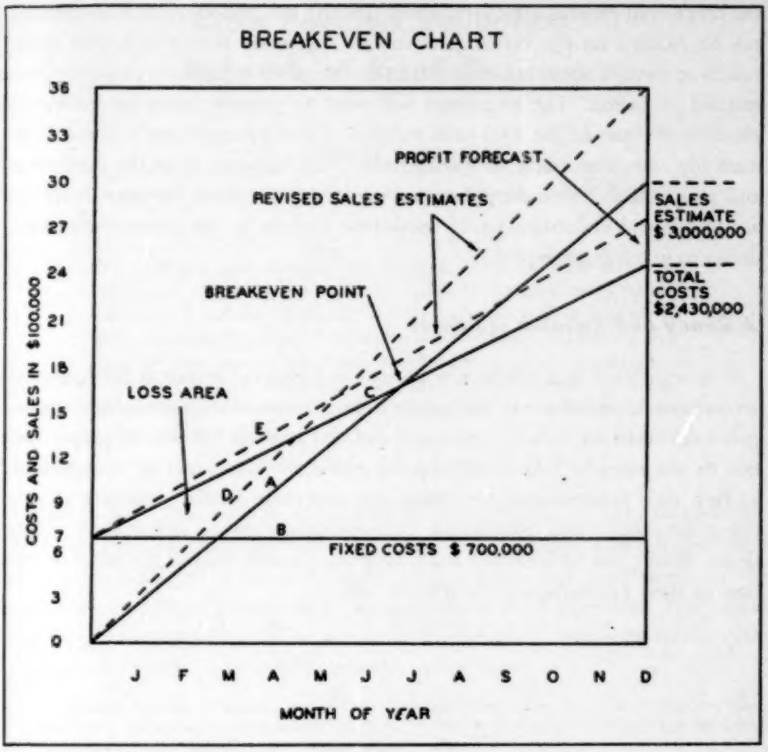

EXHIBIT 3

If we now plot the effects of an increased sales volume of $3,600,000 upon the chart and also a comparable total cost line for these increased sales (Lines D and E), the potential profit for the additional sales would become $800,000 or increase in profits of $230,000 for an increase in sales volume of $600,000. This fact could be illustrated mathematically but it appears much clearer when charted. Management is now able to assert its own viewpoints concerning steps to be taken to, possibly, attain the additional volume. Once the profit potential has been forecast, it can be broken down to reflect the portion which will be necessary for income taxes, dividend payments, or possible bonus or profit distribution to employees.

However, the most important use of any break-even chart is that it clearly sets forth the danger area, i.e., the period in which a company operates until

the break-even point is actually attained. During this period, particular attention can be focused on the various elements of cost more readily and with better results in controlling or reducing them than when the break-even point has been reached or passed. The accountant will want to prepare charts for individual products or lines in the total sales volume. These presentations will not automatically carry their value to management. That depends upon the persistence and analytical ability of the person making the presentation. He can achieve the acceptance and understanding of break-even analysis by the persons who make decisions in top management.

A Ready and Reliable Indicator

It is significant that break-even analysis is a feasible approach for industrial accountants to introduce to management or to increase its usefulness in managerial deliberations, to aid in planning and cost control. Neither its preparation nor its use need be time-consuming for either the accountant or management. In fact, such presentations, well-done, may supersede detailed reporting already being furnished, thus eliminating time-consuming duties rather than adding them. Profits can be predicted and a program for determining the effect of volume on these profits becomes well worth while.

Cash Position Budgeting: Bulwark of Small Business

by ROBERT S. WASLEY

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No elaborate paraphernalia for looking ahead in what might be designated as the "modern manner", utilizing statistical and economical tools, is needed to follow out the common sense provisions of this exposition of a way in which small companies may utilize their essential minimum of historical records—but must consciously do so —to keep in close touch with the facts of their economic situations. A continuing three-month forecast is described and useful daily cash reports are exemplified.

THE BUDGET PROCEDURES which have been developed for large corporations have many desirable applications in the smaller concerns. The intention here is to point out some of the problems of small business and demonstrate the applicability of budget procedures to the solution of those problems. First, what are the general advantages of budget control which small companies would share if the budget were more widely applied? A few are:

1. Budgetary control allocates responsibility, thus relieving management from time consuming details. A successful budget cannot be achieved without first defining areas of responsibility and then formulating the budget on the basis of these areas of responsibility. Identification of these areas has been one problem of the smaller business man. He gets so absorbed in the every-day details of running the business, that he fails to see where it is going. In other words, this budgeting goes back to the organizational setup of the business. A good organization understood by all people concerned is certainly a necessity.
2. Budgeting makes for coordination and teamwork. For example, in the preparation of the required sales forecast, individual salesmen are involved and take active part by estimating what they expect to do in their individual territories. When all salesmen get "into the act", they certainly are more interested in the outcome, because they feel they have a definite part in it. This personal interest developed throughout the organization is a distinctive advantage to budgeting.
3. Judgments and opinions of management are crystallized through budgeting. Of course, it is necessary to anticipate, to guess, even to look into the crystal ball, but a plan of action so formulated is better than no plan at all, at least if it is the result of deep thought and concentrated effort.
4. An advance study in detail of all essential needs for equipment, materials, and manpower is required for budgeting. This detailed study of future needs automatically forces planning for adequate financing.
5. A budget sets up a target. It provides a program which, if attained, will result in improved operations and financial position. If all key personnel have an opportunity to help in its formulation, they will all be concerned with attaining the objective.

Where small business is concerned, one obstacle to budgeting must be met head-on right at the start. So before focusing attention on any one particular phase of the budgeting program, it is well to point out that, in order to accomplish the goal, there is one fundamental prerequisite—an adequate record-keeping system. The one underlying means for comparing the expectations of the future with something tangible is to have a valid historical record of the results of the past. The advantages of budgeting cannot be realized without it.

The Cash Position Forecast: Two Examples of Use

The most useful form of budget for the small company is a cash budget forecasting expected cash transactions within a designated period of time. There are many good reasons for having a cash position forecast. They apply to large companies and are equally valid for small ones. One beneficial result is the assistance it provides in anticipating seasonal fluctuations in business which make heavy demands on funds in order to carry large inventories and receivables. A second purpose of cash budgeting is the assistance it provides in providing for funds to meet maturing obligations. The budget will point out either the adequacy of the existing current sources or the necessity for seeking an additional source in order to meet a specific need for cash. Taxation is another area, well-known to every business, in which the need for cash at the appropriate time is emphatic. The Government does not look too kindly on those companies which do not have the necessary cash on tax due dates. Other financing needs include dividends to stockholders, interest on existing obligations, and plant expansion. When a plant expansion program is anticipated, it is necessary to anticipate having the necessary funds available to carry out that expansion. This is particularly important in times such as these, when a gradual inflation trend has existed for so long a time. Another significant purpose for a cash budget is to assist in having cash available to take advantage of cash discounts and advantageous forward purchasing. Cash discounts and quantity purchase discounts can add up to substantial amounts when the cash is available at the proper time. Considerable savings can be made in cases in which the raw material requirements are of a speculative nature and funds are available to purchase when the market is right.

An excellent example covering the point of seasonal cash needs is offered by a particular candy manufacturing company. A definite seasonal fluctuation is evident in its operations, because of the volume of sales handled during the Christmas and Valentine Day rushes. The big problem of this factory, with its

nine retail stores, is the planning for adequate cash to provide for these times. Cash is needed to pay wages and purchase raw materials, as these outlays fall, for the full twelve months of the year. The company adopted a cash budget, without which, in the opinion of the comptroller, it could not have continued to operate. This example points out vividly the importance to a highly seasonal business of anticipating the demands for cash in adequate time to provide for them.

The need for tax cash is illustrated by another incident. In 1940, two immigrants with little or no education came to the city of Detroit and obtained jobs delivering bread for a large bakery. While doing this, they conceived the idea of making the plastic price tags now found on the shelves of all supermarkets. They also conceived the idea of making the stainless steel molding which holds the price tags. Before long, they had a business which had mushroomed far beyond their wildest hopes or expectations. Then along came the United States' entry into World War II. There was difficulty in accumulating sufficient raw material—stainless steel and plastic—to make the product. The men found a solution. Whenever they were out on sales trips, they bought all the stainless steel and plastic they could get. The system worked very nicely until about 1948, when they suddenly came to the realization that they had high inventory and a high tax liability, as well as sizeable debts to creditors. The two men had never been near a bank, except to deposit money. They had never appreciated the function of credit, never needed it, and hardly knew what it meant. If it had not been for a "good fairy" rescue operation by an individual who recognized the worth of the business, it would not be in existence today. There are no other proprietors anywhere who are stronger exponents of cash budgeting than these two men. They now budget every operation they perform, and display the budget prominently throughout the plant. Everyone knows exactly what goes on and why. They now have a new plant and successfully employ about a hundred people.

It is the cash position forecast which will indicate well in advance when additional cash must be supplied from loans and other sources. This enables the financial manager to make preparation and lay the groundwork for expediting a loan when it is needed. The cash budget likewise facilitates the securing of credit from commercial banks. It provides the answers to the principal questions asked by the banker: "How much is needed?", "How long will it be needed?", and "How will funds be obtained for repaying it?" When these questions are adequately answered by the use of a cash position forecast, half the borrowing battle is won.

Preparation of the Position Forecast: Cash Receipts

In preparation the first question that arises is how exact a cash forecast should be attempted. One major factor which will influence the exactness of the forecast is the degree of seasonality of the business. If the volume varies greatly from month to month or from season to season, the ability to forecast accurately is going to be curtailed. The variations in volume will tend to require approximations rather than exact figures, whereas, if a business has a steady volume, and the past accounting records reflect this condition, it is practicable to budget for a longer period in advance and to do it rather accurately. On the whole, it may be said that the period of a cash budget is generally three months on a continuous basis, with each month dropped at its close and another one added.

What are the sources of data for a cash budget? Where will the basic information be found? There are three primary sources of information for the preparation of a cash budget. First are the figures relating to routine daily operations, second are non-operating transactions (as sources of cash and as instances in which immediate cash must be paid for non-operational items), and third is the long range capital investment program. These are the three sources of information from which data will be drawn in the endeavor to prepare the cash budget.

Starting with cash receipts and with the first source of information mentioned—routine daily operations—the first item to be analyzed would be cash sales. How will the cash sales to be made in the next three months run? One source is the past accounting records. What happened last year for this period? What happened two years ago, three years ago? These questions are based on the assumption that the accounting records extend back through these past periods, which should be true of even the smallest businesses. However, any conscientious effort made, no matter how poor the available records may be, is better than no estimate at all. The estimate of cash sales may be expressed as a percentage of sales volume, based upon past experience. This would mean, finding what percentage cash sales were of the total sales during the comparable three months and if business looks to be the same this year, applying the same percentage to the anticipated dollar sales of the current year.

The second item to be analyzed from routine business operations and which concerns cash receipts is collections on accounts receivable. This is a little more involved. That data in Exhibit 1, which is illustrative in this area, assumes that sales for 1956 were $59,500 and accounts receivable at the end of the year were $18,400 or 30.92 per cent. To estimate cash collections for 1957, the ac-

PROCEDURE TO FORECAST* COLLECTIONS FROM ACCOUNTS RECEIVABLE

Sales (Less Provision for Bad Debts) for Year 1956	$59,500.
Accounts Receivable, December 31, 1956 (Less Reserve for Bad Debts)	18,400.
Per Cent of Sales Uncollected	30.92%
Then Estimate the Collection Thus:	
Accounts Receivable, December 31, 1956 (Less Reserve for Bad Debts)	18,400.
Estimated Sales (Less Provision for Bad Debts) for Year 1957	62,500.
	$80,900.
Estimated Net Accounts Receivable, December 31, 1957 (30.92% $62,500)	19,325.
Estimated Collections for Year 1957	$61,575.

*Historical basis

EXHIBIT 1

counts receivable at the first of the year are added to estimated sales (less provision for bad debts), of $62,500 for a total of $80,900 for the year. Applying the percentage of 30.92 per cent to the estimated sales for the current year determines the estimated accounts receivable balance at the end, which is shown as $19,325. The difference between the balance and the total for the year is estimated collections. The method relies on the management's opinion as to how much it is going to sell. If the business is one having a few large customers, it may be possible to analyze the paying characteristics of each of the customers, i.e., which pay rapidly and which do not, instead of making an overall computation of probable collections. If the business has a high degree of variability of sales, it would probably be more useful to estimate monthly collections. The same reasoning would be applied but on a monthly basis rather than on an annual basis. The presumption in the illustration is that business is fairly constant throughout the twelve-month period.

What about receipts from capital transactions? Here would be included the sale of land, buildings or equipment. It must be determined whether the sale of any such items is anticipated during the accounting period for which the cash forecast is being made. The sale of materials and supplies also must be considered. If the company makes a practice of selling some of its raw materials and supplies, past experience may be used to predict what will be done

in the future. There are other nonoperating receipt sources. As an additional group to be analyzed, there are the financial transactions to be considered such as cash income from investments which may yield interest and dividends. This income may be estimated by going to the underlying instruments and determining what the specific financial characteristics are. Then there may be receipts from bank loans. If one of the purposes of the cash budget is to anticipate the need for cash, the amount of cash which is to be borrowed is certainly a significant item for the forecast.

Preparation of the Forecast: Cash Disbursements

Next the prospective disbursements of cash must be compiled. The first item of cash disbursements of major concern is undoubtedly wages and salaries chargeable to operating expense. The next item is the matter of anticipating what is to be spent for materials and supplies. Assuming that purchases are made on terms of 2 per cent discount if paid within 60 days and that bills are paid ten days after receipt of the invoice or the date on the invoices, one third of the purchases will be paid for in any one month. If bills are received as soon as purchases are made, approximately two thirds of the purchases will be paid for in any one month. On Exhibit 2, the figures for January (reading across the top), show payment for one third of prior month purchases because payment will be made for the purchases during the last ten days in December, on the assumption stated above.

Normal operating expenses must be analyzed from the records of past experience and determination made as to the amounts to be forecast as expenditures on them each month. Planned capital expenditures must be covered, and scheduled financial disbursements must not be overlooked. Dividends to stockholders, national, state, and local taxes all are items which will consume cash and must be anticipated.

FORECAST DISBURSEMENTS TO MERCHANDISE SUPPLIERS FOR DIRECT MATERIAL COSTS

Month	Estimated Merchandise Purchases	Payment for 1/3 of Prior Month's Purchases			Payment for 2/3 of Current Month's Purchases			Total Payments
		Gross	Discount	Net	Gross	Discount	Net	
Jan.	$27,000.	$7,715.	$155.	$7,560.	$18,000.	$360.	$17,640.	$25,200.
Feb.	29,220.	9,000.	180.	8,820.	19,470.	390.	19,080.	27,900.
Mar.	29,925.	9,740.	195.	9,545.	19,950.	395.	19,555.	29,100.

EXHIBIT 2

SUMMARY FORECAST OF ESTIMATED CASH FLOW

	First Quarter*			
	January	February	March	Total
Balance at Beginning of Period	$ 76,500.00	$ 56,533.34	$ 60,016.67	$ 76,500.00
Receipts:				
Accounts receivable	75,000.00	80,000.00	80,000.00	235,000.00
Total cash available	151,500.00	136,533.34	140,016.67	311,500.00
Disbursements:				
Material	40,000.00	30,000.00	25,000.00	95,000.00
Direct labor	10,000.00	10,000.00	9,000.00	29,000.00
Overhead:				
Indirect labor	2,250.00	2,000.00	2,000.00	6,250.00
Rent	2,750.00	2,750.00	2,750.00	8,250.00
Heat, light, power and water	1,050.00	700.00	700.00	2,450.00
Perishable tools, supplies	900.00	700.00	700.00	2,300.00
Insurance and taxes	1,000.00	3,000.00	--	4,000.00
Repairs and maintenance	900.00	500.00	400.00	1,800.00
Selling expenses:				
Salesmen's salaries	4,500.00	3,500.00	3,000.00	11,000.00
Advertising, sales promotion and entertainment	13,500.00	7,250.00	5,250.00	26,000.00
Shipping and delivery expenses	6,000.00	4,000.00	3,000.00	13,000.00
Administrative expenses:				
Officers' and office salaries	8,316.66	8,316.67	8,316.67	24,950.00
Office supplies and contributions	1,600.00	700.00	600.00	2,900.00
Legal and accounting	800.00	2,800.00	900.00	4,500.00
Taxes--corporate	--	--	--	--
Payroll taxes	1,400.00	300.00	300.00	2,000.00
Federal income tax	--	--	22,500.00	22,500.00
Total disbursements	94,966.66	76,516.67	84,416.67	255,900.00
Balance at End of Period	$ 56,533.34	$ 60,016.67	$ 55,600.00	$ 55,600.00

*In use, the statement also has a column for a full year's forecast

EXHIBIT 3

The Position Forecast Complete: Cash Reports

In making a position forecast such as is shown in Exhibit 3, adequate accounting records certainly are prerequisites, but good business judgment and experience play an equal part. Yearly totals are set up and then broken down by quarters, since it is possible to anticipate more exactly on the basis of quarters. The illustration begins with $76,500 in the bank in January. It is anticipated that $75,000 will be taken in from sales and receivables during the month. This provides $151,500 in January. Then, following the line of reasoning previously established, all of the disbursements of cash in the month of January are listed, leaving a net cash balance on hand at the end of January of $56,533. It is noted that this figure is carried forward as the beginning balance in the month of February and so on right through the period. It may be seen that, in any period in which the disbursements will exceed receipts, this condition may be anticipated prior to the time for action. Funds may be borrowed, if need

STATUS OF BUSINESS REPORT (PREPARED DAILY)

Date	Shipments	Shipments to Date	Receivables 30 days old	Receivables Same Date Last Year	Cash Balance
1					
2					
3					
6					
31					

EXHIBIT 4

be, or expenses may be cut down. At least the outgo will not be larger than the income without the knowledge of management in time for corrective action.

However, although cash budgeting may be discussed and even put into effect along lines described here, it will not be helpful unless management is made aware, daily, of just how the cash position is progressing. The budget cannot be made to operate without this, because, after all, it is management which makes the budget work. The budget is only a tool. The communication to management is the cash report. Exhibit 4 illustrates a cash report of a small manufacturer. These few bits of data reveal the pulse-beat of the business. Observe what is learned from this statement, which is furnished on a daily basis:

1. Shipments out of the business that day, in dollars.
2. Shipments to date that month.
3. Receivables 30 days old.
4. Receivables the same date last year.
5. Cash balance.

Exhibit 5 provides an example of what a larger concern does. This concern has divisions in many sections of the country and cash deposits in many banks. As may be seen from the heading on the statement, this is a daily cash report furnished to the central or home office. This is an example of what a larger

DAILY CASH REPORT

	Balance Yesterday	Bank Transfers	Deposits	Disbursements	Balance Today
GENERAL OFFICE ACCOUNTS					
Denver National Bank--Gen'l Acct.					
First National Bank, Denver--P. I. Fund					
First Nat'l Bank, Denver--Payroll Acct.					
U. S. Nat'l Bank, Denver--Payroll Acct.					
Denver National Bank--Dividend Acct.					

EXHIBIT 5

concern uses to keep management acquainted with the cash position. Notice the information which is given for every bank where an account is maintained.

1. The balance yesterday.
2. The interbank transfers.
3. The deposits today.
4. The disbursements today.
5. The balance today.

Needed by Small Business

A position forecast does not manage. It is a tool for management to use. It makes possible reports through which management can determine whether the safe course is being adhered to, day in and day out, and whether the predetermined profit target will ultimately be reached. It is needed by small businesses even more than by large ones because the hazards of a small business are not proportionately less — and its resources from which to recover position are often wholly inadequate.

Group Costing of Products to Simplify Operating Control

by W. R. EBERHART

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Both inventory control and cost performance reporting in the company which serves as background for this article are governed by a method of product grouping and development of cost element ratios to each other and to list price as a common denominator. The usefulness of this method in simplifying the company's accounting and reporting, without introducing significant error, is described.

THERE ARE MANY emphases in cost controls which depend on the type of business activity. In a utility, control over fixed plant and related maintenance cost will usually affect control of the major elements of operation. In a service activity, controls over office or similar expenses will predominate. In manufacturing, controls may require emphasis in the areas of manufacturing cost or inventory or distribution or fixed plant, depending upon how money flows out most freely in the particular type of operation. Direct labor, for example, may range from 10 per cent of all costs in the case of a refinery to over 90 per cent in handicraft specialties.

From this situation stems the elementary principle of cost classification which first serves to establish the cost relationships in the business. The classification process, in turn, becomes the medium of control, for it assists management in directing emphasis and helps in a major way to effect changes in cost-profit ratios from period to period. The period concept is, in fact, another type of classification which, in conjunction with the cost classification concept, helps management to formulate policies. It provides a vehicle for "quantifying" results of product-mix, lot size, purchasing versus own-manufacturing components, and selling structure, all in relationship to each other. Comparisons from one period to the next, reveal the implications of existing situations or the adoption of policies.

How We Approach the Accounting Function

However, the classification procedure, a good tool in the early stages, can become burdensome in a company having numerous lines of products which,

with the passage of time, have become diversified into several hundred different sizes and designs. In such an instance, the *principle* of classification still holds good, but its *application* must be directed, not to multiplying classifications but to developing composite classifications or product groups under which the complexities of control may be minimized for management. This is the central factor in our accounting, as will be apparent from the following list of general guides under which our company's accounting activity is conducted:

1. The accounting function is management-oriented. A major purpose is considered to be assistance in management formulation of product policy based upon inventory cost control.
2. The primary area of accounting emphasis, in this case, is inventory, with substantial reference to profit margins and product-mix.
3. It is recognized that the quality of the exercise of good management judgment will be raised if information needed for decisions is presented without distracting detail and with a clear picture of trends as well as current performance.
4. The viewpoint is taken that the soundest measurement of performance value is one which is embodied in the value of the goods produced and sold rather than a mere index of cost. Such measures are simple and direct and show the relationships between product realization and cost.
5. For greater simplicity and directness, common denominator groupings of product are utilized to overcome the excess detail when products are numerous. Undue emphasis on specific products, in full detail, would bury the management under an avalanche of facts.

The company has a system of direct costs with standards for product materials and product labor. Fixed manufacturing expenses are treated as period costs. At the end of each calendar year, the inventories are adjusted to reflect the inventoriable portion of manufacturing expenses by applying the standard fixed burden rate against the direct labor content of the inventory. On the sales side of our accounting, each product item is assigned a list price and is so catalogued. Chain discounts are applied to obtain net sales values. In invoicing each customer, the applicable discounts are applied against the totals of the extended lists of the invoice.

Development of Group Cost Ratios

The product grouping or common denominator concept has played a strong part in some budgetary control concepts and we find this to be true in our case. The preliminary step to this approach in costing is to group products, that is, to ascertain which have similar ratio relationships of list prices to direct labor and production materials. With the use of scatter charts, the relationship characteristics of items and their components are separated broadly by groups. Special attention is given to the popular items in the line (or lines) to assure that they will be separated in groups containing smaller numbers of products, for the sake of closer accuracy for these volume items. Having separated the

LIST PRICES AND COST RATIOS OF ITEMS IN GROUP 1

Product Number	List Price	Direct Material Unit Cost	Direct Material Ratio to List	Direct Labor Unit Cost	Direct Labor Ratio to List	Total Unit Cost	Total Ratio to List
3200	$2.00	$.20	10.0%	$.10	5.0%	$.30	15.0%
3400	2.50	.24	9.6	.113	4.5	.353	14.1
3600	3.00	.31	10.4	.156	5.2	.466	15.6
3800	3.50	.357	10.2	.178	5.1	.535	15.3
4000	4.00	.388	9.7	.188	4.7	.576	14.4
4200	4.50	.473	10.5	.198	4.4	.671	14.9
5400	3.00	.276	9.2	.159	5.3	.435	14.5
5600	3.20	.341	10.7	.157	4.9	.498	15.6
5800	3.80	.35	9.2	.198	5.2	.548	14.4
6000	4.80	.509	10.6	.202	4.2	.711	14.8
6200	5.20	.556	10.7	.25	4.8	.806	15.5
6400	5.80	.54	9.3	.307	5.3	.847	14.6
6600	6.50	.683	10.5	.286	4.4	.969	14.9

EXHIBIT 1

several groups, the next step is to determine the margin of error which can possibly occur by such grouping. The extent of such possible discrepancy must be contained within the desired degree of accuracy. The historical product-mix of the products within each group is determined and the weighted average obtained. The direct-cost-to-list price ratios derived from these computations are the group ratios which form the standards for costing and inventories.

From the scatter charts, items which appear to have like characteristics and relationships of list prices to cost are assigned to specific groups and the ratios and percentages established as shown in Exhibit 1, which illustrates a segregation of items identified as Group 1. In reviewing this exhibit and all others shown here, it is necessary to remember that *list* sales value, used as a common basis to which to relate costs, is gross sales before chain discounts and far over-indicates gross margin. Each of these items is given weight in the group on the basis of its past percentage of product-mix in the group as a whole. This is done as is shown in Exhibit 2, in which the list prices and ratios in Exhibit 1 are multiplied by the product mix percentage. The results are a composite unit list price applicable to this group of products and corresponding ratios of direct material and direct labor. The composite list and ratios are the standards for the group and are used for costing and establishing unit inventory values. Review of the detail figures indicates that the practical maximum of error can be confined to two or three per cent of either material or labor, in the

DERIVATION OF COMPOSITE LIST PRICE AND COST RATIOS FOR GROUP 1

Product Number	Product-Mix Percentage	List	Weighted List	Direct Materials Ratio	Direct Materials Weighted Ratio	Direct Labor Ratio	Direct Labor Weighted Ratio
3200	3.0%	$2.00	$ .06	10.0%	.30%	5.0%	.15%
3400	5.0%	2.50	.125	9.6	.48	4.5	.22
3600	8.0%	3.00	.24	10.4	.83	5.2	.41
3800	2.0%	3.50	.07	10.2	.200	5.1	.10
4000	4.0%	4.00	.08	9.7	.39	4.7	.19
4200	6.0%	4.50	.27	10.5	.63	4.4	.26
5400	7.0%	3.00	.21	9.2	.64	5.3	.37
5600	3.0%	3.20	.096	10.7	.32	4.9	.15
5800	11.0%	3.80	.418	9.2	1.01	5.2	.57
6000	17.0%	4.80	.816	10.6	1.80	4.2	.71
6200	22.0%	5.20	1.144	10.7	2.35	4.8	1.06
6400	7 %	5.80	.406	9.3	.65	5.3	.37
6600	5 %	6.50	.325	10.5	.53	4.4	.22
	100 %						
Composite list and ratios			$4.26		10.2%		4.8%

EXHIBIT 2

event of a radical change in product-mix. The figures are, therefore, considered sufficiently accurate for use in control of costs and performance.

The *variable* manufacturing expenses—supplies, power, etc., are figured at a standard burden rate accumulated by cost centers as 50 per cent of product labor. Hence the factor for the variable manufacturing expense assigned to Group 1 is half of the labor ratio of 4.8% shown at the bottom of Exhibit 2, or 2.4%. This figure appears in the top line of Exhibit 3 which assembles the

WORKING FACTORS FOR COSTING PRODUCT GROUPS

Group No.	Composite Cost Ratios to List Price: Composite List Prices	Prod. Mat'l	Prod. Labor	Variable Burden	Total	Relationship Among Direct Manufacturing Costs: Prod. Mat'l.	Prod. Labor	Variable Burden
1	$ 4.26	10.2%	4.8%	2.4%	17.4%	58.6%	27.6%	13.8%
2	5.35	12.0	5.7	3.0	20.7	58.0	27.5	14.5
3	7.37	10.8	4.2	2.2	17.2	62.8	24.4	12.8
4	8.95	13.2	6.0	4.0	23.2	57.0	25.8	17.2
5	11.30	11.4	6.5	3.6	21.5	53.0	30.3	16.7
6	12.55	13.2	7.5	4.0	24.7	53.5	30.4	16.1
7	13.35	15.8	7.0	4.0	26.8	58.9	26.2	14.9
8	15.85	17.6	5.7	3.0	26.3	67.0	21.6	11.4
9	17.90	15.4	8.6	4.5	28.5	54.0	30.1	15.9
10	20.25	15.0	8.0	5.0	28.0	53.6	28.5	17.9
11	35.20	16.5	7.5	3.8	27.8	59.3	27.0	13.7

EXHIBIT 3

composite item list price for each group and the related cost percentages. The figures given constitute the working factors needed to accomplish costing.

It will be obvious that the foregoing figures attach a list price sales value to costs by product groups. The mechanics of the related procedure, as used for inventory and operating control complete the story. The standard product labor and material costs for a given period are accumulated by product group. The list value of the standard product costs is derived to serve as dollar control at list prices. For example, in a given period the total standard product labor charged into Group 1 may be $2,000, standard material $4,250, and variable burden $1,000. These figures are converted to list values by use of ratios from the first line of Exhibit 3, as follows:

Labor	$\frac{\$2,000}{.048} \times .276 = \$11,500.$	list value
Material	$\frac{\$4,250}{.102} \times .586 = \$24,416.60$	list value
Variable burden	$\frac{\$1,000}{.024} \times .138 = \$\ 5,750$	list value

The foregoing results are shown in the "produced" line in the inventory summary in Exhibit 4. List price of sales (not net sales) are $45,000. Their distribution to categories and statement at cost levels also reflects application of Exhibit 3 ratios. This approach, applied to all product groups, provides an inventory control for each. No effort is made to classify in-process and finished goods, applied to all product groups as such, until the end of the calendar year. At that time physical count is taken and inventory classification made. In some cases there are direct labor and product material constants within a group. Because of the absence of variability to list prices these items are treated separately. The approach to these exceptions is coordinated with the major costing procedure so far as unit values are concerned, the difference

INVENTORY CONTROL OF GROUP 1 PRODUCTION

	Total		Prod. Mat'l.		Prod. Labor		Variable Burden	
	List Value	Direct Cost	List Value	Direct Cost	List Value	Direct Cost	List Value	Direct Cost
Beginning inventory	$35000.	6090.	20510.	3570.	9660.	1680.	4830.	840.
Produced (add)	41666.60	7250.	24416.60	4250.	11500.	2000.	5750.	1000.
Variable cost of sales (subtract)	45000.	7830.	26370.	4590.	12420.	2160.	6210.	1080.
Ending inventory	31666.60	5510.	18556.60	3230.	8740.	1520.	4370.	760.

EXHIBIT 4

PRODUCT GROUP 1 VARIANCE REPORT

	Variances
Product materials	$500.
Direct labor	400.
Variable manufacturing expenses	-200.
Total variances	$700.
Variance ratio $ 700 / 41666.60 (from Exhibit 4)	1.7
Standard variable cost ratio	17.4
Total adjusted variable cost ratio	19.1

EXHIBIT 5

being that these items are controlled on a unit basis and by separate inventory accounts.

PRODUCT GROUP 1 PROFIT PERFORMANCE REPORT

	Amount	List Ratio
Sales - Group 1 (List value $45,000 from Exhibit 4)	$17000.	37.9
Standard variable cost of sales	7830.	
Variances	700.	
Adjusted variable cost of sales	$ 8530.	19.1
Contribution to fixed expenses and profit	$ 8470.	18.8
Less		
Fixed manufacturing expenses Prorated	3000.	6.7
Selling expenses	1700.	3.8
Shipping expenses	500.	1.1
Administrative and general	1000.	2.2
Total	6200.	13.8
Net Profit	2270.	5.0

EXHIBIT 6

Because of competitive conditions, it has been found that certain list prices assigned to product items which otherwise have kindred characteristics are not proportionately in line with direct costs. However, competitive relationship is not sufficient reason for maintaining this disparity at the list price level. Instead, a revised discount schedule can be assigned to this bracket of product items. We feel that list prices should reflect a specific relationship to direct costs.

Variances from standards for the period are reported as in Exhibit 5 and group profit performance as in Exhibit 6. Where there is need to obtain unit cost by product item, the information is available so that this can be readily assembled. For the most part, simple charts are more effective in showing cost and profit comparisons and, therefore, this medium is largely used.

Simplification Without Loss of Information

In this composite form, adequate information is available for management to interpret performance values. The real advantage is simplicity in procedure and simplicity in understanding—simplicity without sacrificing information required. Groupings are re-examined from time to time, but experience has indicated that they need to be changed only once a year (if at all) or whenever a substantial change of product items composing a group occurs. The latter does not happen often enough to make the maintenance of the system unduly difficult.

By greatly simmering down the quantity of detail requiring management review, the procedure described has eased both the use and application of the information which our system must provide. Exactness and detail are developed only to the degree which can be measured by actual and effective use. The cost measures obtained are sound because they relate costs to selling values. Product decisions, i.e., inclusion, exclusion, repricing, etc., are facilitated. Finally, the control picture has been clarified for the accounting department itself, sharpening and expediting its analytical services to management and providing a continuously developing system which we ourselves find easier to keep lined up with the objectives of our accounting activity.

An Introduction to Administering the Accounting Manual

by W. G. COLE

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Applying changes frequently enough and in a sufficiently orderly manner to keep the accounting manual abreast of changes in accounting procedure as they take place is the concern of this article in which a procedure and forms for the purpose are presented. The goal is to achieve such a systematized (and yet flexible) revision routine that holders of manuals have a useful and reliable tool in their hands at all times.

MANY ARTICLES have been written concerning the preparation of office manuals, covering such topics as style, mechanics, format, content, etc., but it appears that very little has been written concerning a system to control and maintain the manuals after they have been established. In the complex business world today, it is most imperative to have office manuals for many purposes. The problem which arises is that of keeping the manuals up-to-date with the current procedures. The system presented here sets forth a routine to aid in the follow-up, control, editing, issuance, etc., which can be readily adapted to any one of the various types of office manuals. The procedures are entirely workable, inasmuch as they have been put to the acid test of practice over a long period of time.

Manual Coverage and Arrangement

In consideration of this subject, the various kinds of office manuals in use today may be noted. The two lists below are, respectively, by function and scope. Each of the former groups may be subdivided into the latter. The lists are:

By Function

- Organization manuals
- Policy manuals
- Procedures manuals—
  - Guide handbooks
  - Work flow procedures
- Training manuals
- Equipment manuals
- Technical manuals
  - Specifications
  - Maintenance and repair
  - Standard parts

By Scope

- Company-wide
- Departmental or divisional
- Sectional or unit
- Specific subjects
- Groups of related subjects

These lists are not necessarily comprehensive. Nor are all always necessary. Such functional manuals as may be useful can be devised in the various scope classifications which may prove to be appropriate.

This article outlines a system of con-

CONTROL AND MAINTENANCE FUNCTION FOR AN ACCOUNTING MANUAL

- Introduction
  - Scope
  - Purpose
  - Responsibility
- Files maintained
  - Functional purposes of files
- Procedures
  - General instructions
  - Workfiles
  - Historical file
  - Revisions of sections
    - Initiating the revision procedures
      - Revision control
      - Editing control
    - Preparing copy for reviewer
    - Editing copy (or draft) from reviewer
    - Sending draft to print shop for proofs
    - Checking proofs
    - Distributing printed matter
  - Partial revisions of sections
  - Indexing and index card files
  - Reference control files
  - Periodic check lists
  - Stock copies file
- Editing and printing instructions
  - General
  - Editing instructions
  - General printing instructions
  - Typographical instructions
  - Proofreaders marks
  - Examples of proof copy
- Progress and status report

EXHIBIT 1

trol and maintenance for an accounting manual which employes many of these groupings. The manual is arranged as follows:

Preface-introductory remarks and description of general arrangement of the manual.

Master table of contents—classified listing of divisional topics.

Divisions—grouping of matter concerning organization and administration, policy, procedures or practices, etc., as the case may be.

Sections—grouping of matter relative to the divisional grouping.

Master index—alphabetic listing, completely cross-indexed.

(Each division of the manual has its own divisional table of contents and index and each section has its own sectional table of contents and index. Sections represent complete general coverage of matter pertaining to organization, policy, rules of conduct, procedures, etc.)

Organized Files for Manual Maintenance

The original writing and subsequent review for revision of the various sections of the manual are assigned through a manual control unit to administrative personnel responsible for the corresponding functions in the routine conduct of business. With responsibility so assigned, it is then necessary to establish an office routine to maintain an office manual which will be a usable working tool instead of a partly out-of-date hodgepodge of material. The scope and purpose of the administration of the manual should be well defined and properly publicized to all concerned. Exhibit 1 constitutes an outline of the control and maintenance function. Responsibility for this *must* be established high enough in the organization to command respect. That is the secret of proper maintenance. If requests for original writing, review and revision, etc., are not to be backed up by proper authority, the program might function for awhile but will "die on the vine."

Further, efficient administration of an accounting manual implies a background of organized files relating to the work. These, and their purposes, may be identified as:

Workfiles—temporary storage for drafts, proofs, suggested changes, etc.
Historical file—historical record of changes in procedure, etc.
Revision control file—to initiate review for revisions.
Editing control file—to follow-up and control revisions.
Index card files—to develop alphabetical indexes.
Reference control files—to control references, cross references, etc., cited in the manual.
Stock copies file—storage of extra copies of current issues.

In the course of discussing these files, in order, the description will broaden into the setting forth of revision procedures. First, the workfiles consist of two groups, active and inactive. The active workfile should consist of one copy of the latest printing of each section of the manual, subsequent partial changes in the form of "flyers", notes or letters on suggested changes, and corrections and/or additions held until such time as revision is initiated. During the period of a revision, all pertinent data, proofs, drafts, etc., not with the reviewer, being edited, or at the print shop, should be retained here. After a section has been printed and distributed, whether originally or as a revision, the contents of the active file folder should be relegated to an inactive file for a reasonable length of time and then discarded.

As a historical file, a copy of each section and partial changes to it should be retained indefinitely. The contents of this file may often prove to be of considerable value with the passage of time. In this connection, it is suggested that all other units of the company be advised to discard all superseded sections of the manual. However, the manual control unit must be in a position to provide a copy of any superseded matter. The historical file will provide such data.

Revisions Procedures

A definite plan must be developed to provide for the review of existing matter at regular recurring periods in order to keep the manual in a current condition. In addition, instructions (with strong authority) should be issued to the effect that changes of procedure, etc., of a relatively important nature should be brought to the attention of the manual administering control unit (or person, as the case may be). Partial revisions, in the form of "flyers," can then be issued to advise all concerned until such time as the change can be incorporated in the

REVISION CONTROL CARD

TITLE _____ Division _____

Section _____

Reviewers	Initialed Processing	Distributed	Follow-up Date

Remarks:

EXHIBIT 2

EDITING CONTROL

PROCEDURE	COPY FOR REVISION	COPY FROM REVIEWER	PROOF FROM PRINTERY	DISPOSAL DATE: PROOF FROM REVIEWER (DIV)	DISPOSAL DATE: SECOND PROOF FROM PRINTERY (SEC.)
Date Revision Control & prepare Edit Control	1.				
Copy from Active Workfile	2.				
Stamp Copy(s) (Date received)	3.		1.		1.
Insert suggested changes	4.				
Proofread			2.		2.
Distribute:	5.	1.	3.	1.	
	5.	1.	3.	1.	
	5.	1.	3.	1.	
	5.	1.	3.	1.	
	5.	1.	3.	1.	
Verify: (a) paragraph numbers		2.		2.	
(b) changes & insert dots & footnotes		3.		3.	
(c) grammar & spelling		4.		4.	
(d) headings		5.		5.	
(e) legibility		6.		6.	
(f) revd. card - Div., sec. & par.		7.		7.	
- Forms		8.		8.	
- Accounts		9.		9.	
- Company names		10.		10.	
(g) table of contents		11.		11.	
Send to		12.		12.	3.

DATA RECALLED			PRINTED TEXT			WORKFILE
REQUESTED	RECEIVED	RETURNED	RECEIVED	DISTRIBUTED	BOXED	TRANSF. TO DIAGT

Remarks .....

DIV.	SEC.

EXHIBIT 3

printed or duplicator-reproduced matter.

Routine revisions, as opposed to emergency revisions, are controlled by Revision Control Cards (Exhibit 2) which are filed chronologically by the month for follow-up. On the first working day of each month, the cards dated for follow-up in that month should be removed from the follow-up section of the revision control files and an Editing Control sheet (Exhibit 3)

prepared from the data listed. This operation must become a regular routine to ensure review of sections for possible revision. The revision control card then should be placed in an in-process category (in numerical order) until the section is printed and distributed, when the appropriate card should be withdrawn, dated with the next date for follow-up and again placed in the follow-up category.

The editing control sheet serves as a flow chart, check list and record of work accomplished. The form shown here is generally self-explanatory. It will suffice to say that it is designed to control, record and follow each step necessary in the process of revising a section of the manual. Editing control sheets for in-process data should be filed chronologically (latest date on top) in a classified multi-compartment folder having tabs as follows:

1. With reviewer
2. For proofs
3. For printing
4. Being edited

The status of all in-process work can thus be determined at any time by reviewing the editing control sheets, all of which are located in one file folder. As indicated, sheets are removed when the applicable section is printed and distributed.

The data accumulated for a section during the period following the last printing, should be withdrawn from the active workfile, suggested changes should be made, the copy stamped "for revision" and forwarded to the proper person or persons for this purpose. Follow-up measures should be used to ensure return of the copy within a reasonable period of time. Upon receipt of the corrected revision, the control unit is responsible for editing. Some of the items checked or corrected in this process are continuity of style, sub-section and paragraph numbering, grammar, spelling, signaling of changes, proper footnotes, headings, side captions, etc. At such times drafts of tables of contents are prepared for any revised section of five or more pages.

The operation of sending material to the print shop for proofs or preparing masters for office duplicators needs no explanation. However, it is advisable to establish comprehensive instructions for the over-all make-up of the manual. When proofs are received, they should be control numbered and proofread. Copies should then be sent to the reviewer for approval, correction or further revision, if necessary, and returned for printing, index preparation and final check to the reference control files (to be described).

Distribution of revised sections of the manual should be made in accordance with established and approved mailing lists. A simple columnar form can be used for this purpose. Where distribution is extensive, it is wise to provide decentralized distribution points. For example, in a multi-plant

operation, each plant may be held responsible for maintaining an up-to-date mailing list. A filing instruction sheet should accompany each distribution.

Between revisions, partial revisions or flyers should be initiated, processed, duplicated on office duplicators and distributed, whenever a reasonably substantial change or important change in accounting procedure is made, if such change does not warrant the immediate reprinting of a section. Flyers should be initiated in draft by the person or persons responsible for the particular section involved. For purposes of distribution and inclusion in the office manual, the flyers should be reproduced on one side of the paper, with a separate letter of transmittal or filing instruction sheet. Each sheet of the flyer should be properly identified with top headings and should bear the date of issuance in the lower-left corner.

Revision of indexes requires special comment. A common fault in indexing matter which is changing quite often is that of indexing too finely. It is better to confine indexed matter to headings and side-captions in the text. Sectional alphabetical index cards should be made for each section of the manual. Indexes should be printed for distribution when a section comprises ten or more pages. Sectional index cards should be inter-filed to prepare divisional indexes for distribution. Divisional index cards should be combined to prepare a master index. Cards must be immediately sorted by section reference in order that subsequent revisions can be recorded on them.

INDEX CARD

Acct.....

	Div.	Sec.	Par.
1			
2			
3			
CROSS - INDEXED:			
(a)			
(b)			
(c)			

EXHIBIT 4

CROSS REFERENCE CARD

Div. _____ Sec. _____

Printing Date _____

PAR.	MAKES A REFERENCE TO			PAR.	IS REFERRED TO IN		
	Div.	Sec.	Par.		Div.	Sec.	Par.

EXHIBIT 5

Monthly or quarterly revision of the divisional and master indexes usually suffices.

An example of an Index Card is shown as Exhibit 4. This card provides for basic indexing into three references for an item. It is seldom necessary to exceed three. Also, the card provides a record for three cross-index entries (for each of which a similar card is prepared) showing the cross-indexed item on Lines 1 to 3. The cross-index cards do not show any entries under the "cross-index" portion of the card. Such cards are corner-clipped—the lower left corner—so that they may be speedily sorted-out of the alphabetical deck. Listing the cross-indexed items on the basic index card provides a record of cards which must be changed if the basic indexed item is changed.

Reference Control Files; Stock Copies; Instructions

What may be called "reference controls" provide a ready means of verifying such things as:

1. Divisional, sectional or pargraph cross references
2. Account titles or numbers cited
3. Form titles or numbers cited

It is important that these files should be currently maintained, inasmuch as a change in one cross referenced item or portion cited may have an effect upon various sections of the manual. Where extensive changes occur, these

MISC. REFERENCE CARD

TITLE _____ NO. _____

REFERENCE			DATE		REFERENCE			DATE		REFERENCE			DATE	
Div.	Sec.	Par.	Printed	Checked	Div.	Sec.	Par.	Printed	Checked	Div.	Sec.	Par.	Printed	Checked

EXHIBIT 6

reference files prove to be very valuable. For example, the name of an account is changed. It is then necessary to locate every paragraph in which the account is cited in the manual. The information is available in the reference control files. Exhibit 5 shows a form used to control divisional, sectional or paragraph cross references. Exhibit 6 shows a form used to control accounts, forms and other matter cited in the text.

To ensure that the proper printed issuances of the manual are in the hands of the recipients, check lists should be issued periodically. Such lists show the manual divisional and sectional numbers, the respective titles and the last printing date, including dates of any flyers applicable to them. At some decentralized locations, it has been considered advisable to "call in" the manuals, or parts, from the persons on the mailing lists. The recalled manuals are then reviewed, brought up to date (if necessary) and reissued. In this manner, it is possible to determine if the recipients are permitting carelessness in maintaining their copies of the manual.

Extra copies of each section published should be retained in a stock copy file so that requests for additional copies (either of sections or of complete manuals), additions to the mailing lists, etc., may be filled. Experience alone can determine the extra copy requirements which should be established for each section. Remember that it is usually more economical to have a reasonable surplus than it is to run short and put the job back on the press for a re-run.

Instructions should be prepared for the guidance of persons who contribute to the manual. Such persons are authors, originators of revised or rewritten material, copy preparers, compositors, proofreaders and editors. Careful observance of the instructions will facilitate the printing of the manual, assure good typographical appearance and will assist materially in keeping printing expenditures to a minimum. Exhibit 7 is a reproduction of the table of contents of such instructions, which will indicate the subjects covered.

EDITING AND PRINTING INSTRUCTIONS

TABLE OF CONTENTS

Subsection	Subject	Page
100	General	1
200	Editing instructions	1
201	Principal rules to be observed by authors, those preparing revisions of standing copy and editors	1
202	Review of original and standing copy by editors	2
203	Preparation of copy for the printery	2
204	Indications of revisions over previously printed pages	2
205	Table of contents	2
206	Index	3
300	General printing instructions	3
301	Text make-up	3
302	Page make-up	3
303	Submittals	3
400	Typographical instructions	5
401	General	5
402	Headings	6
403	Paragraph numbering	6
404	Listings	7
405	Tabular work	7
406	Forms	8
407	Use of italics	9
408	Capitals	9
409	Numerals	10
410	Abbreviations	11
500	Proofreaders' marks	12
600	Examples of proof copy	12
601	Marked proof	12
602	Corrected proof	13

EXHIBIT 7

An Economical Approach

All of the control and maintenance work with respect to the accounting

ACCOUNTING MANUAL PROGRESS AND STATUS REPORT

Part A - Progress Within Past Six Months

			(Prior 6 months)
1.	Material printed		
	(X items)	sections	sections
	All other	sections	sections
2.	Reviewed but revisions not required		
	(X items)	sections	sections
	All other	sections	sections

Part B - Status as at (Date)

		Less than 1 Month (Sections)	1 to 2 Months (Sections)	Over 2 Months (a) (Sections)
3.	Material at printery for printing			
	(X items)			
	All other			
4.	Material at printery for proofs			
	(X items)			
	All other			
5.	Proofs with reviewer			
	(X items)			
	All other			
6.	Stock copy with reviewer			
	(X items)			
	All other			
7.	Proof copy being held in suspense			
	(X items)			
	All other			
8.	Proofs or other matter being edited			
	(X items)			
	All other			

(a) See detail list attached

EXHIBIT 8

manual may be reported to management in a very simple manner. Exhibit 8 shows a Progress and Status Report prepared at six-month intervals. The term "X items" represents a grouping of very important sections, such as general accounting orders, etc. Therefore, they are reported as a separate group. Reporting is kept to sections, whether the section consists of two pages or 100 or more pages. It is not necessary to report number of pages handled, or some other volume indication, as management is fully cognizant of the work that has to be done.

The system might appear rather involved and requiring much clerical work. Actually, that is not the case. The system is so designed that, even in a large organization, it can be administered by one person, or the tasks can be spread to several persons as part-time duties. Practice has proved that the procedures outlined are workable and about the minimum that will provide proper control.

A Records Management Procedure

by J. W. NEEDHAM

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Inventorying present records, organizing to administer new ones, classification of common records and establishment of retention periods, and carrying out of transfers to archives and for destruction are all treated in a concrete manner in the procedure presented in this article, which is specific as to authorities involved.

IN OUR APPROACH to the problem of records management, it was recognized that day-to-day procedure does not provide for establishing control over records now being retained in departmental files and the archives. This requires an initial inventory. Hence, this procedural description is in two main portions, one describing such an inventory and the other setting forth continuing procedures. In the procedure as a whole, provision is made for the appointment of departmental representatives in each of the departments who are responsible for records management in the respective department, a chief records clerk to coordinate the entire program, and review of records problems, with particular attention to retention times, by the general auditor and the tax manager.

The following terms, applicable to both parts of the article, establish our understanding of the meanings of the various phases of records management:

1. Record—Books, drawings, blueprints, maps, films, photographs, forms, reports, correspondence, working papers or other materials, regardless of physical form or characteristics, made or received by a department in connection with company business.
2. Archives—The location where records are stored by office services when they become semi-active or inactive. (No record is accepted unless a retention period has been established.)
3. Departmental Record—Records used frequently in the conduct of everyday administrative and operating activities, generally housed in the same office or area as the administrative or operating personnel.
4. Vital records—Records which are not replaceable immediately, and are required for the company's continued operations as a corporation, legally, or as a working organization in producing, marketing, and transporting company products. Examples are charters, franchises, deeds, leases, patents, blueprints, and drawings.
5. Valuable records—Records required to prevent large financial loss or to recover moneys to replace buildings, equipment, work-in-process, finished products, materials and supplies. Examples are fixed asset ledgers, claim files, accounts receivable ledgers, insurance policies, and balance sheets.
6. Important records—Records of which a reproduction could be obtained only after considerable delay, confusion or labor but which would not seriously affect operations in the meantime. Examples are personnel and payroll records, mailing lists, statistical and operating records, trial balances, and profit and loss statements.

7. Useful records—Records which are not required for current operations but are being held in accordance with retention schedules for legal reference or historical purposes.

INITIAL INVENTORY OF RECORDS

To establish control over records stored in departmental files of the company, a program was established under which each department, as scheduled by the chief records clerk, took physical inventory of all records filed in its department. A departmental representative was responsible for the inventory and worked with the chief records clerk in developing the program and setting the target date when the inventory was to be completed. The form used in taking the physical inventory was a record retention and disposition inventory card. Information was shown on the card as follows:

1. Company form number.
2. Date inventory card was completed in the department.
3. Department or division responsible for the retention of the record being inventoried.
4. Title of form if possible; otherwise, a complete description of the record.
5. Inclusive dates of the record.
6. Division or section preparing the record.
7. How record was prepared—pencil, typewriter, etc.
8. File sequence, whether alphabetical, numerical, etc.
9. Manner of filing of record, fire protective vault or safe, letter, legal or card file, books, binders, or desk drawers.
10. Location of file in the department.
11. Total square feet of space or number of file drawers required to house a year's supply of the record.
12. Maximum retention period for which the record is required in the department.
13. Maximum retention period for which the record is required *by the department* in the archives.
14. Retention period—total.*
15. Microfilm—when.*
16. Microfilm—retain film.*
17. Disposition.*
18. Category—classified as "vital", "important" or "other".

* Established by tax manager, general auditor, and/or secretary's office.

When all departmental records had been inventoried and retention periods established for the maximum length of time the records were required for the department's use in both departmental files and the archives, the inventory cards were reviewed and, if in order, approved by the responsible division and department head, then forwarded to the chief records clerk. Upon receipt of the cards, the chief records clerk transferred the data to the applicable record data card. If a data card had not previously been prepared, he prepared one, obtaining any additional information required from the respective departmental representative. When the physical inventory was completed in all departments, the chief records clerk reviewed each data card and obtained all necessary information on missing parts of the record. When this process was completed, he routed the data card to the tax manager and the general auditor for their determination of whether the retention period was sufficient and for final approval. Upon the return of the data card, corrections, if any, were made to

the inventory card, which was then returned to the departmental representative. The data card was then placed in file.

In our case, because the departmental locations may be designated as a high rent area, particular attention was given to possible transfer of records to the archives, as provided for in the retention periods determined to fulfill the program.

CURRENT PROCEDURE

This procedure prescribes the methods for reviewing and controlling all company records to insure their retention in both departmental files and the archives for periods required by law and for company protection, and to guard against their being filed and stored beyond a useful length of time. The office methods division of the accounting department is responsible for the development and over-all administration of practices relating to the records management program. The chief records clerk in the office methods division, the office services manager, the tax manager, and the general auditor, or their authorized representatives, are the company managers who have records retention and disposition responsibilities over and above regular departmental responsibilities. Any particular records management problems which have not been foreseen are discussed with persons from the foregoing group, either individually or in a meeting called for the purpose. The advice obtained from the group is considered by the person presenting the problem in making his decision.

The chief records clerk is appointed by the chief accountant and is assigned the responsibilities of co-ordinating the entire program within the company. His specific responsibilities include completing a record data card for each record. This card lists all necessary data required to carry out the objectives of the program. He is assisted by departmental representatives and authorized representatives of the tax manager and general auditor. He also expedites the handling of records destruction authorizations in obtaining departmental, tax manager, general auditor, and (where necessary) legal approval or disapproval from the secretary's office. It is his responsibility to insert information as to the date of the record and "when destroyed" in the space provided on the record data card. He initiates studies to effect reductions in retention times and number of items filed.

Each department head assigns to an individual the responsibility of handling all records problems in the department. He is chosen as an employee having a good understanding of the functions of his department, its systems, forms, and records. The departmental representative's duties include, but are not limited to:

1. Departmental contact for the chief records clerk.
2. Assisting the chief records clerk in obtaining a complete description of each

record and other data necessary to complete a record data card.

3. Maintaining follow-up on retention dates established for departmental records and seeing that a storage label is properly completed and attached to the records when they are forwarded from his department to the archives. (One week's notice of such movement is furnished to office services.)
4. Obtaining departmental approval of record destruction authorization on a form prepared by office services covering records stored by them. (If the destruction of a record is not approved, the representative lists the reason for further retention and notes the new recommended destruction date on the authorization.)
5. Initiating record destruction authorization at the end of the retention period for all departmental records which have *not* been sent to the archives, and handling their salvage or destruction upon the return of the approved authorization.

New Records: Correspondence, Reports, and Forms

Generally speaking, the majority of new records on which it is necessary to establish retention dates, as they are created, are correspondence, reports and forms. All correspondence sent to departmental files or the archives is marked in the routing block to indicate the number of months it should be retained. The following list serves as a guide in deciding the retention time for correspondence:

Letters to be destroyed immediately and never filed:

1. Unimportant letters which require no acknowledgement or follow-up, such as notes of appreciation, congratulations, etc.
2. Form letters which require no follow-up.
3. Other letters of inconsequential subject matter or which definitely close correspondence to which no further reference is necessary.
4. Copies of interdepartmental or other company correspondence where another copy of the same letter is in the file.

Letters to be filed temporarily (30 days to 12 months):

1. Letter of general inquiry and replies which complete a cycle of correspondence and have no value after possible reference from the correspondent within a reasonable length of time.
2. Letters requesting shipment which have no further value after shipment is made.
3. Similar letters of various types to which reference might be made shortly after they are received or written but which soon cease to have value unless further immediate correspondence ensues.

Letters to be kept from one to three years:

1. Letters about expense accounts which have limited value after accounts are balanced.
2. Collection letters which have limited value after the account is paid.
3. Letters relating to rentals, establishing credit ratings, etc.
4. Letters explaining company policies.
5. Letters making short-term company commitments which expire within one year.
6. Quotation letters.
7. Letters to which distributors might make reference a year or two later.
8. Other letters to which some reference might be helpful as late as one to three years after date.

Letters to be kept permanently:

1. Letters pertaining to patents, copyrights, licensing agreements, etc.
2. Letters important to interpretation of government contracts.
3. Letters which constitute a contract or long-term commitment of the company.
4. Letters denying liability of the company.
5. Other letters which the company might need to produce in court more than three years after date in order to disprove liability or enforce rights of the company.

Upon issuance of a new report by a department, a copy (of the initial re-

port only) is forwarded to the ledgers and statements division for review and assignment of an index number. The retention time is shown on the report. It is recommended that the issuing department show the length of time it retains the report so that receiving departments are guided in establishing their retention times. The ledgers and statements division supplies the chief records clerk with the necessary information to complete a record data card for the report.

When a new form is requested from the forms control section of the office methods division, the forms analyst obtains from the requisitioner and enters on the record data card all pertinent information required for proper construction and design of the form. When the forms analyst has all of the information necessary for the design of the form, it is forwarded to the chief records clerk for completion, after which it is forwarded, together with a copy of the form, to the tax manager and general auditor for classification as vital, important or other; review of the total retention period, review of the methods of destruction, determination of whether the data card should be referred to the secretary's office for review of the retention period, and for approval. The approved data card then is returned to the chief records clerk. Upon receipt of an approved record data card on a new form, the chief records clerk notifies all departmental representatives involved as to retention dates, and files the data card.

Transfers to Archives; Approvals for Destruction

The departmental representative notifies office services by telephone one week in advance of the date when the records are to be moved to the archives in accordance with retention periods. A storage label is prepared and attached to the files showing the following information:

1. Description and form number, if any.
2. Period covered.
3. Department transferring record.
4. Salvage date.
5. Remarks (method of disposition: salvage, microfilm, burn, shred, etc.)

When the records are received at the archives, if the disposition is to microfilm, the records are filmed and held until a detailed check of each document is made against the film, before being salvaged or destroyed. If the disposition is to retain the document, a record retention and destruction data card is prepared showing the same information as listed on the label. A storage location is assigned and posted to the data card. Then the records are placed in storage.

Once each month, the records supervisor of office services reviews the file of record retention and destruction data cards to determine whether or not any salvage dates listed are coming up for review within the next month. If so, a records destruction

authorization is prepared, listing the following information:

1. Date issued.
2. Title or description of record.
3. Title on label if different.
4. Period included.
5. Salvage or destruction date.

The authorization is routed to the department originating the record for review and necessary approvals and then to the chief records clerk who attaches the related record data card and obtains the approval of the tax manager and general auditor. If final approval is received, the chief records clerk enters the date of the records and the date destroyed on the applicable record data card. In the event that the salvage or destruction date is not approved by the department originating the record, the tax manager, general auditor or secretary's office, the reason for further retaining the records and the new recommended salvage or destruction date are shown in the appropriate space on the authorization. The chief records clerk returns the authorization to the archives, where the records are either salvaged or destroyed, or the record retention and destruction data card and the storage label are corrected to show the revised retention date.

When the departmental representatives' follow-up record indicates that the retention period on departmental records not to be sent to the archives has expired, he initiates a records destruction authorization listing all required information and forwards it to the chief records clerk. The latter removes the related record data card from file, verifies the accuracy of the retention date and, if in order, attaches the data card and handles in the same manner as for records being transferred to the archives, except that the approved destruction notice is returned to the departmental representative. The departmental representative makes the necessary arrangements with office services for moving the records to the reclamation section of the manufacturing department for salvage or destruction as indicated on the authorization.

Planning Ahead for Office Space

by JOSEPH H. PITTENGER

Organization & Methods Analyst, Armstrong Cork Co., Lancaster, Pa.

Part of the avowed mission of the present paper is to draw attention to the fact that managerial and service space requirements embodied in a company's office will expand with growth of the business and that this may sometimes escape notice. The outlines of a procedure are developed in the course of the article, which is based on an analysis of present and prospective personnel by department and their space needs.

HAVE YOU LOOKED at your office space situation lately? The chances are that you have a problem of which you are not yet aware. Our national economy is growing by leaps and bounds and, undoubtedly, your business is growing along with it. For each percentage increase in your volume, the clerical and administrative force probably has not grown in the same proportion, due to greater efficiency and mechanical application. In fact, despite alarming overall statistics sometimes cited, the increase in the number of your office employees may have been so gradual that management has failed to recognize office space as a problem in relation to present and future considerations of marketing, production, etc. However, if you have not come face to face with the inadequate space situation—with its accompanying inefficiency, inconvenience, and bad morale factors—the time to start investigating is now, rather than to wait for it to develop into a major emergency consideration at some future date.

A Space Inventory and Analysis

The first step in such an investigation is to take an inventory of all available space. Every office should be measured and its exact size and the location of its parts plotted on blueprints. From supervisors and department heads should be obtained the following information:

1. Number of persons now employed.
2. Number of persons to be added or released during the next three years (allowing time to construct new office space, if necessary).
3. An estimate of the total number of persons who should be required on a long-range basis, possibly five to ten years beyond the three years already projected.
4. Special equipment or unusual working space required to perform assigned tasks.
5. Flow of work to and from other departments and individuals, and necessity for personal contacts with these groups.
6. Number of times per day work is transferred to and from other organization units, and the degree of necessity for fast trip service between these units.

After obtaining all of the above facts, an analysis sheet should be prepared for each department, indicating number of private offices, semi-private offices, enclosures and general clerical areas, with square feet per person. Compare these figures with standards determined to be adequate for operating needs. A suggested standard is offered below:

Private office—150-250 square feet

Semi-private offices—90-120 square feet per person

Enclosures—90-120 square feet

General office areas—75 square feet per person

NOTE: The figure of 75 square feet per person should be increased if there is an excessive volume of files, special equipment, etc. Conversely, stenographic and key punching personnel would require less space per person, because they have very little equipment.

The present requirements in square footage (after adjusting to standard square footage), the requirements for three years from the present, and those of the selected future projected date should be posted to the analysis sheets and each of the three columns added to derive the grand total space requirement for these three periods. Do not include square footage for walls, corridors, service facilities, rest rooms, etc., in these space requirements. In converting net figures to gross square footage of new construction required, architects suggest that 25 to 30 per cent be added to net requirements for these purposes.

You will probably find that some departments have more than adequate space, while others are crowded to the point of reducing effectiveness. Furthermore, certain departments probably will, in the near future, require additional space which is not available near their location, if at all. Under these conditions, the future requirements as estimated by the various department heads could not be provided with existing facilities. Therefore, the space situation should be resolved into two major considerations. The first is what shall be done for the present and for approximately three years to provide adequate space until additional office areas can be constructed. The second involves size, type and location of office area to be constructed for future expansion.

Short-Range Needs

From the short range-viewpoint, there appear to be the following possibilities:

1. Review all work areas and reduce the space provided for each department to the established standards, allowing sufficient leeway to provide the anticipated three-year requirements.
2. Where possible, substitute smaller desks and/or functional equipment to reduce the required space below established standards.
3. Adapt adjacent production areas for office use or obtain leased space from outside sources and move selected organization units to these areas. The criteria for this selection should be the following:
   a. The unit requires only limited contacts with other sections or departments.
   b. The unit does not require close supervision or guidance from the next higher supervisor.

Long-Range Considerations

After the short-term planning has been completed and a satisfactory course of action started, it is essential that the long-range planning be begun immediately. When you consider the time involved in planning, obtaining management approval of the selected master plan, drawing blueprints, obtaining steel, and constructing a building, three years can go by very quickly. There are a number of courses of action to provide additional space on a long-range basis, some of which are described below:

1. Move out of present offices into new building—This would be practical only if the present building could be converted economically to needed production space or if the obsolescence would be low enough to justify the sale or abandonment of the present building.
2. Build addition to existing building—From an economical viewpoint, the building itself must be capable of supporting additional stories without expensive construction and bracing, or sufficient land must be available adjacent to the present building.
3. Retain present building and either build an additional building, adapt production space, or obtain outside space.

When considering any of these possibilities a number of factors must be carefully reviewed. The first is morale. The attitude of the people affected by necessary organization unit moves can cause considerable disturbance or can be used to improve general performance, according to the selection of units to be moved and the accommodations provided. Another consideration concerns work centers and flow of work. The flow of work must be studied carefully and all units working together should be moved as a group to a new location. If this principle is not followed carefully, a general slow-down in office production may result. Then, there is the matter of communications and personal contacts. Messenger service at least comparable to existing service must be provided for re-located units. In fact, a study to improve messenger service coincidental with physical moves might serve to help offset other inconveniences and eliminate the necessity for personal messenger trips which consume valuable time. If it is necessary for company personnel to make personal visits to certain organization units, those units should be located as centrally as possible. Also, assuming central stenographic services to be more economical than stenographers assigned to each organization unit, any division of the office might require a second general stenographic section in the new location. In the case of centralized files, each separate unit possibly could handle its own files without too much extra cost or inconvenience to other units.

There are other factors involved in planning for an expanded office. When considering a division of the office, facilities for supplying hot lunches or sandwiches should be provided. Another factor is parking, because there is an increasing demand for parking space. It is essential to plan for adequate parking space and

improved traffic conditions if a new office location is to be selected. More people are driving their cars to work with fewer passengers. Car pools seem to have lost their popularity. At the same time, land in commercial and industrial areas is being bought up rapidly for present or future expansion. Above all, there should be cost studies. Each possible course of action in the construction of remodeling of additional office space should be compared on the basis of cost per square foot. It may well be that the most advantageous move from the viewpoint of the factors already described might be so costly in relation to other moves that a second choice plan will finally be selected. Whichever plan is chosen, there must be included a means to provide for future growth. If this is not considered during current construction, the company may, at some future date be in a worse position than at the present time, with respect to office facilities.

Every office supervisor should be aware of the space situation and its long-range implications. It should be his responsibility to alert his superior concerning potential trouble sources within the assigned work area. Only through group action, in many cases, will a serious office-space problem be presented for management's immediate attention.

Letters to the Editor

WHAT IS AN ACCOUNTANT?

Editor, N.A.C.A. Bulletin:

AT ONE EXTREME, the accountant is clearly not just a bookkeeper. At the other, it is hard to tell where the work of an accountant shades into operations and operating management. Accounting, starting with bookkeeping, keeps going on to higher and higher levels until some old-time accountants start protesting that it is no longer accounting. But, surely, the accountant ought to have a good idea of the boundaries of his work.

Let us take a current definition occupying a middle ground. Under it, accounting consists of:

1. Design of accounting systems
2. Installation of systems
3. Operation of systems
4. Preparation of statements
5. Interpretation and analysis of results.

This covers a lot of ground. Even so, considering the problems arising in accounting today, it seems quite inadequate. It does not go far enough down to fundamentals or up high enough to uses. Many questions raised in accounting, whether or not proper functions of accounting in the strict sense of the word, may be answered without reference to a journal or a ledger. Other solutions may be obtained by supplementing the books of account. All this the accountant must know. For instance, many of the criticisms of direct costing may be answered by the simple statement that most of the advantages may be obtained statistically. The accountant must know what this involves and how to do it. Then we have cost estimates, standards, budgets, incentive systems, and the rest of the field of cost accounting, a part of accounting but not necessarily accounting if the above definition were strictly followed!

There is also the whole field of processing data, whether key sort systems, tabulating systems, or electronic data processing. In addition, there are many other mechanical devices used in accounting. There are many kinds and makes of machines. With all these the accountant must have varying degrees of familiarity. Still other areas are rapidly developing. There is the field of reporting where new ideas are constantly being developed. There is continuous study of the means of producing such reports, to keep them comparative, simple, easy to understand, economical to produce, and helpful to use. In connection with reports, there is the question of whether to employ formal statements, text, oral presentation, spot reports, charts and line trends.

But this is not all. It is within the province of the accountant to know the company's product, something of product engineering, productivity measurement, industrial engineering and management, automation, incentive systems, guaranteed annual wages, supervision, the handling of men, personnel management, labor relations, training and teaching, and the technique of persuading other functions of the business to use accounting products. It is even said that the accountant needs a background in liberal arts, the humanities, economics, finance, investment, mathematics (including statistics), taxation, and business administration. Then there are a multitude of general problems affecting accounting practice, such as effects of inflation and depreciation methods used. Certainly the accountant, also, needs knowledge and judgment that come only from experience. How else will he really un-

derstand such factors as materiality, internal control, voucher system, and the independence of the auditor?

The topics begin to defy classification or even grouping. The accountant works on developing return on investment consciousness, evaluating return from research, break-even points and profitgraphs, and economy and shortcuts in accounting. He studies the problems of loss on small orders, accounting for new products, product costing to support price differentials, centralization (of time-keeping, for example), elimination of files and records, telegraphic transfer of data, interplant reporting systems, obsolescence in inventories, and many other problems.

This is a far cry from the view of the accountant's job as a matter of just recording what has happened. Even now we have not touched on accounting specialties embodied in such fields as municipal, fund, public utility and uniform accounting, and have barely mentioned tax accounting, internal control and auditing.

What is an accountant? Whatever he is now, he will not be just that tomorrow. He will be more. Just the same, it might be helpful to define him. Who will try?

FRANCIS G. WEITHMAN

HORIZONS AND THE INDUSTRIAL ACCOUNTANT

Editor, N.A.C.A. Bulletin:

THE ACCOUNTANT OCCUPIES an increasingly prominent place on the horizons of the modern industrial and business world and is being accorded more and more recognition as time goes on. The dictionary definition of "horizons" refers to a limit or range of perception which is usually applied literally to the apparent junction of earth and sky. In applying it to the future of accounting, however, it seems hardly appropriate to emphasize the word "limit." Rather, the emphasis should be on the fact that the horizon recedes as one progresses toward it. One never reaches the horizon or limit of his ability to achieve. Forward-thinking accountants will continue indefinitely to push back the horizons of industrial accounting.

In viewing our horizons, we should be constantly alert to accept our full responsibilities and opportunities. There are two principal types of management. The first type is going somewhere and knows it. The second is not going anywhere and does not know it. The difference lies in leadership and in constructive thinking. We should and can participate in these activities. We should constantly analyze ourselves and our areas of responsibility. We must take a look at our men, materials, machines, layouts, job schedules, work loads, methods, procedures, performance, etc. We should first be intimately acquainted with what we are doing. Next we should analyze the significance of what we do, why we do it at all, whether we need to do it, why we do it in the present way, what better ways there are to do it, what it would cost to change, and what it would save if we did. We must train ourselves to do our own thinking in a constructive manner and then take steps to correct those things which, according to our self-analysis, require correction.

The broadening of accounting horizons can be accomplished only by full and effective utilization of the potentials of accountants. This means development not only of ourselves, but of our associates or subordinates as well. We must establish and maintain training programs which will develop men as qualified replacements for others who will have gone on to more important responsibilities. We must combine our abilities as leader and teacher, training those under us to think and decide for themselves, giving assignments that will perhaps "stretch" a man but never break

him, developing the best in ourselves and in others.

An accelerating change of long-standing is that much of our record keeping is done on machines. Yet these machines only process the figures supplied them. The figures are the raw materials of accounting, the raw materials which must be further processed and which must be analyzed and interpreted. This requires the skill and judgment of trained accountants. The resulting reports are the bases upon which decisions involving millions of dollars are made daily in our business world. Management increasingly depends upon accountants for interpretation of basic facts on which operating decisions are based. These analyses, coupled with orderly and scientifically produced projections by economists and other specialists, enable managements to keep abreast of competition—and the more fortunate to stay ahead of it. In connection with machines, we have heard much recently concerning automation which, when related specifically to accounting and statistical fields, is known as electronic data processing. The full impact of this will be upon us not very far in the future. We are vitally concerned with this. It behooves us to use this tool and not be overwhelmed by it.

The horizons of the world are constantly changing. The dawn of each new day brings news of these changes. We are an integral part of all that goes on in this world of change. Our future will depend on our ability to change with change—to keep abreast of new developments in business and to be alert to the opportunities they hold for each of us. Let us be positive in the approach to our responsibilities and in the performance of them. It is up to each of us to broaden our horizons. As we broaden our individual horizons, we in turn will collectively broaden those of our profession.

CECIL F. ADAMSON

THE NEW FRONTIERS: ELECTRONIC EQUIPMENT AND OPERATIONS RESEARCH

Editor, N.A.C.A. Bulletin:

THE INQUISITIVE MINDS of scientists have become focused on accounting, particularly with regard to its management aspects and in two particular areas, the solution of accounting problems through the development and application of electronic computers and through the newly-created science of operations research.

Familiarity of readers of this letter with the application of electronic computers to the processing of accounting data will undoubtedly vary from a passing to an intimate acquaintance. The prospect of maintaining accounting records as invisible magnetic impressions on a reel of metal or plastic tape is little short of overwhelming. Moreover, although, traditionally, accounting machines have started out as very crude models, the first electronic computers applied to accounting data processing have been excessively efficient and costly machines previously used for solving involved mathematical formulas and containing far more speed and flexibility than can ever be used for accounting purposes while input and output mechanisms remain limited. The problem, therefore, in increasing the applicability of the electronic computer to accounting processes is to build less expensive machines.

Problems which electronic computers pose for accountants are in the two general areas of control and operation (which involves planning or programming). In processing accounting data, electronic computers perform a number of steps, some of them simultaneous and some in sequence, at tremendous speeds without printing or leaving any other visible tracks in the process. As a matter of fact, ability to do just this is the essence of the tremendous possibilities

of these machines in the accounting field. However, it can readily be seen that such an operation requires the tightest kind of internal control and accuracy, since an error at the beginning of a process would be compounded many times before any visible results are obtained.

As to operation, one of the first challenges with which a business is confronted in thinking through an electronic computer installation is how to organize for it. The machines have such amazing capacity for producing several kinds of information simultaneously from the same media that the traditional lines between accounting, personnel, production planning and control, and other operating and service departments become more difficult, if not impossible, to draw. It might appear that, if all paper work is to be processed on a consolidated basis, accounting will get lost in the shuffle. I doubt that this will happen. On the contrary, many accountants will be relieved of the necessity to concern themselves with detail and can spend full time on matters concerning which most accountants presently complain they cannot find time for. Still others, who have become quite expert at applying their routines to tabulating and other kinds of business machines and enjoy it immensely, will find the programming of their problems on electronic computers even more enticing. They will also find that their tabulating experience will give them a head start in this new field. Document flow is one of the most important problems to be dealt with in planning an electronic computer accounting installation. For this reason, accountants with systems experience should, after adequate exposure to what these machines can do, be among the best qualified to develop and install electronic computer accounting data systems.

The companion challenge, that of operations research, is the newest and in many respects most interesting application of science to the solution of accounting and financial management problems. It was first used during the Battle of Britain, initially to determine how to best utilize planes in the defense of the British Isles and minimize submarine sinkings and, finally, to plan the most effective utilization of planes in the bombing of industrial and military installations when the battle shifted from defense to offense.

It is a series of techniques and utilizes all of the present management engineering techniques such as charts, graphs, time and motion study, work simplification and methods analysis, combining them with newly-developed ones. New techniques are the "Monte Carlo" method, scientific sampling, linear programming, queueing or waiting-line theory, symbolic logic method, information theory, search theory, automatic feedback control and the game theory. The common characteristic of all of them is the use of involved mathematical formulas.

To date, the application of operations research to industry has been primarily in the solution of production and operating problems. However, its use has been extended to inventory control, testing bonus plans, and measuring clerical operations for which accounting has traditionally played a major role.

The question with which we are concerned is what the impact of these new developments will be on the accountant. For one thing, it seems that the education of the accountant of the future should provide for training in the use of higher mathematics in order that the techniques of the operations research teams may be understood. As a matter of fact, a combined educational background of mathematics and accounting may be one of the best entrees into operations research. The accountant's relationship to operations research will undoubtedly be of two kinds. First, he may

be called upon to serve as the accountant technician on an operations research team or to furnish the orientation and analytical data required by such a team. Second, he may be called upon to appraise the conclusions of an operations research project in terms of whether or not they are completely sound technically and would provide the best known solution to the problem.

The basic challenges to accountants are the same today as they were yesterday and the day before yesterday. They are to furnish more and better information to management and to perform clerical tasks at the lowest total cost. The application of science to accounting has provided us with two tools in the electronic computer and operations research which provide us with greater potential for meeting these two basic challenges than we have ever dreamed of before. Experience has proved that making maximum use of these tools is not a job for the scientist alone. Accountants are facing an exciting, challenging and rewarding future in working with scientists and executive management to solve business problems, some of which have at times appeared to some to have become so big and complex that they defy solution.

T. JACK GARY, JR.

Notes on Current Reading

Books

The Punched Card Annual of Machine Accounting and Data Processing

The Punched Card Publishing Co., 836 Maccabees Bldg., Detroit 2, Michigan, 1956, 205 pp., $8.50.

Perhaps forty separate articles and twenty shorter "tips on tabulating" comprise, with manufacturers' advertisements, this fifth volume of an annual in what is now the field of electronic equipment rather than that of punched card equipment only. Sample article titles, e.g., "Computer Programming and Methods," "Integrated Data Processing in the Office," "Machine Accounting Techniques Lower Periodic Report Costs," "Combined Tax Accounting," "Dollar Value Sales Analysis" and "Plant and Property Records" indicate relevance of contents to industrial accountants as do other titles to more specialized lines. Among the latter are "Agent's Report," "P & S—Oats, Wheat, Cotton, Coffee," and "Premium Notices."

Operations Research — A Basic Approach

American Management Association, 1515 Broadway, Times Square, New York 36, N. Y., 1956, 111 pp., $2.50 to members, $3.75 to nonmembers.

A group of eight papers on a topic of rapidly emerging interest and slowly emerging comprehension on the part of most of those interested is offered here, from "Operations Research: A Challenge to Management" to "A Look Ahead: New Developments and Applications." The route between these papers is by way of others on "Operations Research as a Functional Corporate Job," "Winning Management Acceptance of Operations Research," "Operations Research in the Allocation of Resources," "Product Distribution and Multi-Plant Scheduling Through Operations Research," "Operations Research in the Engineering Laboratory," and "Operations Research in Aircraft Maintenance."

Machine Tool Leasing

J. L. Treynor and Richard E. Vancil, Management Analysis Center, Inc., 275 Newbury Street, Boston, Mass., 1956, Paper Bound, 147 pp., $15.

An "outgrowth of work done by graduate students" in a course in taxation at the Harvard Business School, this study explores a new area within the relatively new province of real estate and equipment leasing as an alternative to purchasing, whether for operating or tax considerations. The latter are largely confined to a single chapter among the ten in the work as a whole, one of which takes up the "inherent advantages of machine tool leasing" and another the making of decisions on issues involved.

Widening Horizons for the Accountant

Thomas L. Morison and James J. Kiely, Editors, Bentley School of Accounting and Finance, Boston, Mass., Third Revision, Paper Bound, 1956, 378 pp.

Subtitled "Selected Readings in Accounting Literature," this somewhat extensive bringing together of papers relating the work of the accountant to professional responsibilities and to business situations, contains many excerpts from the *N.A.C.A. Bulletin* among the over forty articles included. Originally issued in 1950, the collection was first revised in 1953. Each article is "supplemented with a variety of exercises."

SELECTED ARTICLES FROM ACCOUNTING PERIODICALS

ACCOUNTING RESEARCH, *October*, 1956 (Cambridge University Press, 32 E. 57th St., New York, N. Y.)

Cost Accounting for a Small Manufacturing Concern. Robert G. Allyn.
Accounting in Relation to Law. H. McCredie.

THE ARTHUR YOUNG JOURNAL, *October*, 1956 (Arthur Young & Co., 165 Broadway, New York, N. Y.)

Public Utilities and Liberalized Depreciation Under the 1954 Internal Revenue Code. John L. Harvey.

THE CONTROLLER *December*, 1956 (2 Park Ave., New York 16, N. Y., single copy $.50)

Inadequate Depreciation in the Metals Manufacturing Industry. Wilbert A. Walker.

THE INTERNAL AUDITOR, *December*, 1956 (120 Wall St., New York 5, N. Y., single copy $1.00)

The Audit of Operations. O'Ferrell Estes.
The Application of Statistical Sampling Techniques to Auditing. E. W. Gaynor.
Evaluation of Internal Control. E. D. McMillan.

JOURNAL OF ACCOUNTANCY, *December*, 1956 (270 Madison Ave., New York 16, N. Y., single copy $.75).

Petroleum Accounting. Horace R. Brock.

L.R.B. & M. JOURNAL, *July-Sept.*, 1956 (Lybrand, Ross Bros. & Montgomery, 90 Broad St., New York 4, N. Y.)

Equipment Available for Integrated Data Processing. Francis E. Moore.

THE NEW CERTIFIED PUBLIC ACCOUNTANT, *December*, 1956 (677 Fifth Ave., New York 22, N. Y., single copy $.50)

Accounting for Investments in Jointly-Owned Associated Companies. Eugene L. Ziehe.
Standards of Education and Experience for CPA's. Daniel Lipsky.

RETAIL CONTROL, *November*, 1956 (100 West 31st St., New York 1, N. Y., $.75)

Let's Argue Expense Center Accounting.
Expense Center Accounting Manual Revisions.

Organizing for Effective Systems Planning and Control

American Management Association, 1515 Broadway, Times Square, New York 36, N. Y., Paper Bound, 1956, 192 pp., $3.50 member, $4.50 nonmembers.

There is a considerable variety of approaches and centers of interest evident in the seventeen contributions which make up this study. Sample titles of the papers are "Imagination in Office Systems Work," "Systems Plannings in a Smaller Operation," "Development Planning for Management Decision," "Use of a Measurement and Standards Program" and "Reporting as a Technique to Compel Performance."

Fiscal-Year Reporting for Corporate Income Tax

W. L. Crum, Technical Paper 11, National Bureau of Economic Research, 261 Madison Ave., New York 16, N. Y., 1956, 72 pp., $1.25.

Referring to the "steady shift toward fiscal-year reporting" for tax purposes, this study identifies the interest of various groups in the trend, either favorable or adverse, and indicates its progress and status among various divisions of the industrial economy, both as to line of business and as to company size; including size "in terms of net income or deficit".

For Your Information

INFORMATION FROM THE RENEGOTIATION BOARD

TOWARD THE END of 1955, the Renegotiation Board published regulations to correspond with the amendment of the Renegotiation Act, passed at the last session of Congress, relating to exemption of commercial articles and services. These regulations had been published earlier in tentative form. In their final form, they constitute Subpart B of Part 1467 of regulations relating to the Renegotiation Act of 1951. (Subpart A consists of prior regulations, still applicable to fiscal years ending on or before June 30, 1956.)

The Board's release describing the new commercial exemption states that "it contemplates two separate procedures," which are set forth in the release as follows:

"One part of the exemption, that relating to standard commercial articles, is self-executing, in that it is to be applied by the contractor himself without application to the Board. For exemption under this provision, an article must be customarily maintained in stock by the contractor or offered for sale in accordance with a price schedule regularly maintained by him, and at least 35 per cent of the aggregate dollar sales of the article by the contractor during his fiscal year must be sales not subject to the renegotiation law.

"The other part of the exemption relates to standard commercial classes of articles, to standard commercial services, and to articles or services which are "identical in every material respect" with a standard commercial article or service. This part of the exemption is not self-executing. In order to obtain exemption for any such articles or services, the contractor must file with the Board an application known as the Application for Commercial Exemption. No printed form is prescribed for this application, but the regulations specify in detail the information and data that must be included therein. If the Board does not deny an application within three months after it is filed, the sales in question are exempt, except that in the case of a standard commercial class of articles, a period of six months after filing is provided."

The release further explains:

"Specific provision is made whereby the contractor may formally waive the exemption, in whole or in part, for any articles or services. As in the past, neither the exemption nor a waiver of the exemption is effective beyond the fiscal year with respect to which such action is taken. Each fiscal year is treated separately and the contractor may claim or waive the exemption for each year without regard to what he has done for any preceding year.

"When a contractor files an application for exemption, the Board will act thereon before taking any action with respect to any other renegotiable business of the contractor in the same fiscal year. To facilitate this procedure, contractors are encouraged to file an Application for Commercial Exemption as soon as practicable after the close of their fiscal year. The application must be filed not later than the date upon which the contractor is required to file a financial statement with the Board for his fiscal year.

"In applying the self-executing part of the exemption, or in making an application for exemption, sales figures for the item or class of items for which exemption is claimed are to be determined by any of the sales segregation methods acceptable for renegotiation generally.

"Certain procedural provisions of a protective nature in the former regulations are also continued in the new regulations. If a contractor's application is defective, or if the Board requires information in addition to that contained in the application, the regulations provide that the Board must request within 60 days that the defect be corrected or the additional information be furnished. The 3-month or 6-month period within which the Board is required to determine the claim for exemption does not begin to run until the defect is corrected or the additional information is supplied.

"Concurrently with its new regulations, the Board also published in the Federal Register a notice extending until February 1, 1957 the time of all contractors with fiscal years ending on July 31, 1956 or August 31, 1956 to file an Application for Commercial Exemption or a financial statement as required by the Act.